Marine Review

SHIP OPERATION SHIPBUILDING CARGO HANDLING

The National Publication Covering the Business of Transportation by Water

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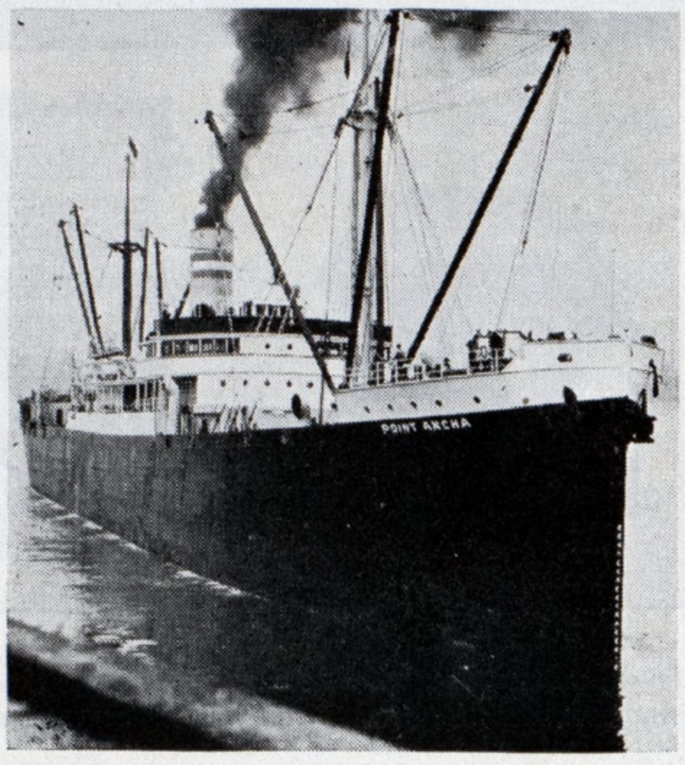

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Cleveland Office, Penton Bldg.
A. H. JANSSON, Editor
F. V. COLE, Business Manager

New York Office, 220 Broadway
R. D. MacMILLEN, Eastern Manager
E. C. KREUTZBERG
B. K. PRICE

Chicago Office, 1118 Peoples Gas Bldg.
L. C. PELOTT
W. G. GUDE

Pittsburgh Office, 507-8 Oliver Bldg.
S. H. JASPER
E. A. FRANCE JR.

Washington, D. C. Office, 1050 National Press Building
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Marine Review

FOUNDED 1878

SHIP OPERATION - SHIPBUILDING - CARGO HANDLING

Volume 64 March, 1934 Number 3

The Merchant Marine and the President

THE President's emphatic statement at a recent press conference is reassuring. He is strong for an adequate and efficient merchant marine. He believes that it is necessary for the development of commerce and essential as an auxiliary to the navy in time of national emergency. Furthermore he recognizes that the differential in cost of operation due to the higher American standard of living makes government aid necessary if our ships are to compete in foreign trade.

So far, the President is in complete agreement with his predecessors in office. But he believes that the method of providing this aid under the guise of mail contracts is wrong. He is in favor of a straight out subsidy which, incidentally is what President Harding proposed and failed to obtain. That the President is set on a change in the form of aid and in the method of allocation seems evident.

It is possible now to appraise, on the basis of experience, the results from the merchant marine act of 1928 in which aid to shipping took the form of mail contracts. It was never the intention of this act that payments were for service rendered in carrying the mails. It was intended to establish and maintain ship services in all world trade routes considered essential on account of present or probable future commercial importance.

A "bald subsidy" as the President puts it now, would then have had no chance of approval. In the light of actual experience under the mail contract system and backed by the great influence of the President, it will now very likely receive the enthusiastic support of the congress.

The formulation of the President's plan will wait on the recommendations of the secretary of commerce. These recommendations will be based upon the report of the director of the shipping board bureau. The director will study each mail contract and the results attained. He will make a careful survey to determine what the differential in the cost of operations may be between American and foreign vessels.

In spite of all the criticism, some of it undoubtedly justified, and in spite of the unsavory facts developed concerning the operation of the mail contracts, a vast residue of real accomplishment remains. Selfishness, greed, and unethical practices have not been uncommon and are by no means confined to the marine industry. In fact it was so common throughtout the land that a promise of a new deal placed its sponsor in the White House.

All fair-minded men will agree that such practices should be eliminated, but, since we still live in an imperfect world, we must not refuse to see that some values exist. Obviously, without the mail contracts, none of the forty odd splendid new American ships, all rendering fine service and building up prestige and good will, would have been built.

It is a pity that every dollar of mail contracts was not used to a similar purpose. But this is no reason why we should lose sight of the fact that a great deal of good has been accomplished. We must hold on to this advantage and, with the lessons learned, build still better and demonstrate to ourselves and to the world that the genius of success is not endangered by a democratic form of government.

New Boiler Code, Tentative Draft

THE bureau of navigation and steamboat inspection, under the direction of D. N. Hoover, assistant director, has completed tentative revisions of that part of the general rules and regulations which apply to the de-

sign, construction and repair of boilers. The new rules represent very thorough and painstaking labor in applying modern advances to the bureau's regulations concerning marine boilers.

No attempt was made to hurry this work. Every part of the new rules was carefully studied and consideration was given to all sources of reliable information before drafting.

The most radical departure is the incorporation of a complete code to govern the construction of boilers and pressure vessels by fusion welding. This action was influenced by the fact that fusion welding in the construction of boiler and pressure vessels has for some time been sanctioned by the United States navy and under the rules of the American Society of Mechanical Engineers. The new rules also contain a modern piping code.

The committee to co-ordinate marine boiler rules, made up of eminent engineers, which has prepared this final draft and the bureau which prepared the preliminary draft and also co-ordinated all the sources of information, are to be congratulated on the thoroughly scientific and very practical contribution these rules offer in the design and construction of marine boilers.

Prompt action in adopting the new rules should and will no doubt be taken, so that modern practice may be applied to the construction of marine boilers with very definite resultant benefit to the marine industry.

United Fruit Co. Reports Substantial Earnings

When Francis R. Hart president of the United Fruit Co., submitted the annual report to stockholders Jan. 29 it received widespread attention because of the statement that, of the cash on hand $13,802,375 may be used during the year, if so determined, to retire the obligations to the United States government incurred for the construction of six mail ships. This would mean anticipating the payments of instalments not yet due and having approximately 17 years still to run, on the basis of 20 years.

The net income of the company for the year 1933 after depreciation, interest and taxes was $9,240,941.65 or $3.15 per share as compared with $5,707,221.48 or $1.95 per share in the previous year. Cash and United States government securities on hand at the close of the year amounted to $37,-118,807.40 as compared with $27,067,-916.99 at the end of 1932. This is exclusive of the company's insurance fund of $10,000,000. The report continues in part as follows:

"It is the policy of the company to write off each item of property over its estimated useful life. Charges for depreciation, included in 1933 operations, amounted to $9,133,477.50, approximately the same as last year. In addition there has been charged to operating expenses the sum of $829,-976.53, representing the remaining book value of properly sold or retired.

"Dividends declared and charged to surplus during the year amounted to $5,811,980 and were equal to $2 per share, as detailed in the report.

"During 1933 the company paid to the United States shipping board the sum of $633,437.50 to redeem the six serial notes which became due during the year and the sum of $396,978.52 in payment of interest on the entire loan. The balance of the notes outstanding on Dec. 31 last, is $13,802,-375.

"The company's fleet comprises 92 owned ships, aggregating 427,347 gross tons and 5 ships chartered from other companies, aggregating 8457 gross tons, or a total of 97 ships aggregating 435,804 gross tons. During the year this fleet made 979 round trip voyages and sailed 4,853,719 nautical miles. The fleet carried 39,441 passengers and 591,139 tons of general cargo, in addition to transportting 941,846 tons of company fruit and other products.

"Of the European fleet, the steamships MONTAGUA and CHANGUINOLA, both of which were purchased in 1914, have outlived their usefulness, and were sold for scrapping. The steamships GREENBRIER and MIAMI have been sold.

"To meet the demand of Florida citrus fruit growers, the company inaugurated, through a subsidiary, Refrigerated Steamship Line Inc., a refrigerated steamship service between Florida and North Atlantic ports. This service is available to all Florida shippers. Operations began in November, 1933, with services from Tampa and Jacksonville to New York.

"The company continues to carry practically all of its own insurance, with the exception of that on the new mail ships. This insurance fund of $10,000,000 is invested in United States government bonds.

"On the whole, all departments of the company in 1933 show substantial improvement and the efforts of the employes are reflected in the results. Every endeavor is being made to insure efficient and economical operation."

Commerce at Los Angeles Shows Increase

The year 1934 has started out with a fine record for foreign trade and water commerce generally.

Exports in the month of January amounted to $5,891,000, compared with $4,263,068 in January a year ago, an increase of 33-1/3 per cent.

Imports during the month were valued at $2,575,000, compared with $1,840,776 in the same month of last year, an increase of 40 per cent.

Total commerce through the port aggregated nearly $70,000,000 in value, compared with $52,117,289 in January, 1933.

This, in brief, is the story of the upward trend of business. Every trade —domestic, Hawaiian and foreign— showed increases in value, and all but coastwise shipments showed increases in volume. There was a decrease in tonnage of coastwise shipments although the value was higher. This is accounted for by the fact that there was a larger volume of merchandise and less bulk oil.

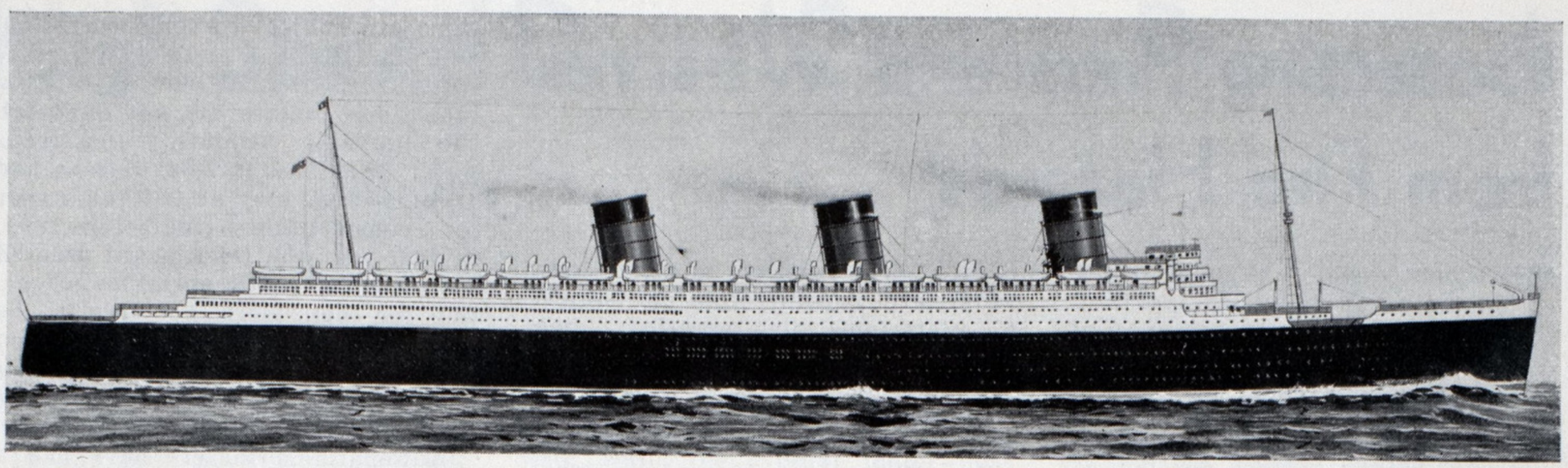
Hawaiian trade, both in and out, was double that of a year ago.

Intercoastal business increased more than $2,500,000 outbound and more than $8,000,000 inbound.

Oil shipments made a considerable gain, being approximately 2,000,000 barrels more than in December, 1933, and 1,200,000 barrels more than in January a year ago.

Lumber receipts in the month of January just closed, amounted to 31,-197,000 board feet compared to 19,408,-000 board feet in January a year ago.

May 22 will mark the one-hundred-fifteenth anniversary of the sailing of the SAVANNAH the first steamship to cross the Atlantic, and the second public celebration of Maritime Day.



Drawing of New Cunarder—Building at John Brown's, Clydebank, Scotland. Length 1018 feet—Speed estimated, 31 knots

CUNARD-WHITE STAR

Merger to Receive Government Aid

THE long impending merger of the North Atlantic services of the Cunard and White Star lines is now just about an accomplished fact. The necessary steps to put the agreement into effect are being taken and, it is expected, will be completed promptly.

In an agreement between the British treasury and the Cunard Steamship Co. and the Oceanic Steam Navigation Co. (the White Star Line), for merging the North Atlantic vessels and other assets of the two companies into a new company to be called the Cunard-White Star Ltd., the treasury is to advance not more than £3,000,000 for completing the Cunard liner No. 534. In addition to this the treasury is to advance £1,500,000 as working capital and up to £5,000,000 for building one or more additional liners.

Work on Liner Suspended

Work on the Cunard liner No. 534, under construction at John Brown & Co., Clydebank, was suspended at the end of 1931. It is now expected that work will be resumed soon, probably early in March. It is estimated that resumption of work will give employment to 1500 men directly and indirectly to 10,000. If work progresses at the rate anticipated, the new vessel should be ready for launching by next October or November.

The agreement between the government and the two companies has been very carefully worked out in detail. It is provided that the new company is to be and remain under British control. Included in the assets of the new company is the good will of both the parent companies and the use of the Cunard and White Star names and flags; the unfinished liner No. 534 and the contract with the builder, John Brown & Co. Also included are the North Atlantic fleets of both companies. In the Cunard fleet are the vessels BERENGARIA, AQUITANIA, MAURETANIA, FRANCONIA, CARINTHIA, SAMARIA, SCYTHIA, LACONIA, LANCASTRIA, ALAUNIA, AUSONIA, ANDANIA, ANTONIA, AURANIA, and ASCANIA. In the White Star fleet are: MAJESTIC, OLYMPIC, HOMERIC, GEORGIC, BRITANNIC, ADRIATIC, ALBERTIC, LAURENTIC, DORIC, and CALGARIC.

In the arrangements made the treasury is to advance £3,000,000 for completing liner No. 534. The money will be supplied gradually and as required. For this purpose the Cunard Steamship will receive £1,000,000 to be secured by an issue of debentures carrying interest up to Jan. 1, 1940 at a rate of ½ per cent below the bank rate and thereafter at a rate of interest appropriate for government guaranteed loans. The new company is to receive £1,000,000 secured by debentures paying interest at the same rate. The new company will also receive an additional £1,000,000 secured by an issue of income debentures which shall bear interest at 3 per cent up to Dec. 31, 1939 and thereafter, 5 per cent.

The above is all for the completion of No. 534. In addition the treasury will advance £1,500,000 to the new company to be used as working capital. This sum is to be secured by debentures and income debentures in equal amounts with interest at 5 per cent.

Funds for Additional Liners

To provide for additional liners the treasury will have the authority to advance, in its discretion and on similar terms, a sum not exceeding £5,000,000.

Under the agreement the Cunard company will turn over to the new company the sum of £1,000,000 which it is to receive from the treasury for the completion of No. 534. For this and other assets the Cunard company will receive 62 per cent of the entire initial capital of the new company. The White Star company for its assets will receive 38 per cent of the shares of the initial capital of the new company. The agreement does not specify the initial nominal capital and working capital for the new company. It is understood that these will be fixed later in agreement with the treasury.

It is further specified that the new company is to have a board of ten directors including the chairman. Of these six are to be nominated by the Cunard company and four by the White Star. To the new company will be credited the business carried on in North Atlantic by the two parent companies from Jan. 1, 1934.

I. M. M. Gives Up Agency

Work on No. 534 commenced in Aug. 1930, though the Cunard had decided in 1928 to build two superliners. Due to condition of business, work on No. 534 was suspended on Dec. 10, 1931. The characteristics of the new liner, which have been referred to repeatedly and may, before she is completed, be somewhat modified, are: gross tonnage, 73,000; length 1018 feet; beam, 112 feet; speed estimated at over 30 knots; total horsepower, delivered to four propellers, 180,000.

The International Mercantile Marine Co., as announced in the February issue, will cease to act as general agents for the White Star line in the United States and Canada, effective June 30, 1934. From that time on under the terms of the merger it is understood, the Cunard line will handle the White Star agency and vessels in the United States.

Protecting Piers and Wharves from Fire Hazards*

THE inaccessible and unprotected underside of many wharves and piers contain large amounts of combustible material. Cross bracing in both directions, small clearance at high tide, and closely spaced piles prevent effective use of streams from hose or fireboat nozzles. The dampness is not sufficient to prevent fire. Once started, fire spreads rapidly through the piles and bracing, which are often oil-coated, and along the plank underdeck. Largely out of reach, it eventually eats into the piles sufficiently to weaken them, and the entire structure collapses.

In 1932 five wharf and pier properties were completely destroyed by fires of this kind at a loss of $2,350,000. In 1931 major losses amounted to $12,000,000 and in 1930 to $6,800,000.

Construction of Piers

Most of the older wharves and piers are of timber construction with wood-frame superstructures, usually two stories high. The superstructures are generally well protected by automatic sprinklers, but the vulnerable underdeck timbering is usually without any protection.

More recently, some piers and wharves have been built with concrete piles and decking, and noncombustible superstructures. Although average good concrete suitable for ordinary work is subject to disintegration in salt water, this can be somewhat retarded by special care in selecting aggregates and in mixing and curing so that a dense concrete is obtained. External waterproofing compounds and preservatives have also been used to retard disintegration of concrete piles, but the most promising method appears to be one developed within recent years at Los Angeles, which consists of making pre-cast concrete piles impervious to sea water by impregnating them with asphalt, using a vacuum-pressure process similar to creosoting lumber.

A less expensive but relatively safe type of construction is provided by concrete deck slabs on steel beams incased in concrete to prevent corrosion, the whole supported by transverse rows of timber piling. By designing the deck slabs with adequate strength, the distance between the rows of piles can be made great enough to prevent the ready spread of fire. The concrete is above high water level and therefore not subject to appreciable disintegration. Oak piles in salt water last about forty years, if not exposed to mechanical injury and if rain water cannot enter and seep down into the top of the piles. This simple type of construction serves the requirements of the average industrial plant economically and satisfactorily, giving a structure which is fairly permanent and which would prevent or at least greatly retard the rapid spread of fire.

Subdivision of Large Areas

Subdivision of large areas under existing combustible pier decks is important. Practically all pier fires have shown the need of transverse fire barriers not over 200 feet apart.

The most economical type of barrier consists of a substantial wooden bulkhead of 4-inch splined planks butted closely together, attached to one face of a row of piles, and extending the full width of the wharf, from below low-tide level up to the underdeck. A row of sprinkler heads on each side of the bulkhead greatly improves its fire resistance. Bricks and mortar or similar non-combustible material should be used to make a tight point between the top of the bulkhead and the underdeck.

Concrete barriers are more substantial. The thickness required for proper strength and permanence would add considerable but not prohibitive weight to the piles. Installation on existing piers would be more expensive than on new piers.

"Gunite" bulkheads reinforced with galvanized welded fabric attached to the face of the piles provide a tighter firestop than plank bulkheads, but are more difficult to install because of having to be shot in place to a thickness of 2 or 2½ inches. Denser than poured concrete, they withstand the wave and chemical action of the water much better.

Automatic Fire Protection

Although permanent, non-combustible construction for new wharves and piers is desirable, adequate protection against fire in the great number of unprotected timber structures now in use is even more important.

The desired goal is to extinguish a fire at its very start. In view of the success of automatic sprinklers for building protection, they have also been suggested as the most satisfactory method by which water could promptly be applied to a fire under wharves with closely spaced timber.

Although sprinklers in such locations are subject to some corrosion, and installation and maintenance costs are higher, in one outstanding case these factors did not outweigh the probable benefits. Disastrous water front fires in New Orleans had averaged well over $1,000,000 a year for a considerable period before 1931. In that year the Dock board ordered complete automatic sprinkler protection for their piers, not only in the sheds but for the entire underdeck space. This system has 112,478 heads and is probably the largest single sprinkler installation in the world.

Automatic sprinklers have had a long record of remarkable effectiveness in fire protection, and though the experience with installations under piers is yet limited, they are considered the most promising method of protecting the underdeck areas of piers. In cases where it might not be feasible to maintain automatic sprinklers, open sprinklers manually controlled by easily accessible valves would provide reasonable protection if watch service is available so they can be quickly turned on.

Special Fire-Fighting Equipment

Public fire departments and other agencies have been working on the development of special equipment to apply water directly to the underdeck timbering. The Boston fireboats are equipped with "pup" boats propelled by outboard motors and equipped with small hose and a pump of 75 gallons per minute capacity. These small boats are designed for use in restricted areas and have proved effective where conditions of heat and smoke, height of tide, and the open nature of the timbering beneath a wharf or pier permitted their use.

Another device is a type of pontoon which by means of an extension handle can be pushed under the pier when there is not sufficient head room for a "pup" boat. A hose line is suspended along the handle and terminates in a nozzle at the pontoon. This nozzle delivers a heavy stream directly upward against the underside of the wharf deck.

Cellar pipes and revolving nozzles are also commonly used, but are suitable only where the deck planking is easily removed or where holes have already been provided or can be readily cut. Many of the existing plank decks are covered with a layer of concrete from three to six inches thick, so that the cutting of holes is extremely difficult.

The most important use for these special nozzles is to surround and confine a fire. Pier decks having an overlay of concrete should therefore have permanent openings at proper intervals protected with suitable covers. After experiencing several fires, the Boston & Maine railroad cut such openings in their piers and provided short lengths of pipe with a large sprinkler head at one end and a hose coupling at the other.

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*Reprinted from the September, 1933, issue of *Factory Mutual Record*, published by the Inspection Department, Associated Factory Mutual Fire Insurance Companies, 184 High street, Boston.

High Speed Diesel Engines Proposed

In Multiple Units for Ship Power

By H. R. Ricardo*

I AM going to plead the case for the really light high-speed diesel engine for marine propulsion.

In the first place and speaking quite as an outsider, I find it difficult to make out a case for a diesel engine of any sort in really large or very fast vessels. What advantage can it show over the modern steam turbine, except in fuel economy? And even this is slight when the cheaper fuel which the steam plant can digest is taken into account. As the size of unit increases, the steam plant becomes more efficient, relatively lighter, and cheaper; the diesel engine, however, gains nothing in efficiency, but grows enormously in specific weight, while its constitution grows weaker and its initial cost heavier.

There must be a point on the scale of size where the rising curve of the steam plant and the falling curve of the diesel cross. I submit that that intersection lies somewhere about the 6,000 horsepower mark, and further that it is unlikely to vary much in the near future, since the scope for improvement would appear to be quite as great in the steam plant as in its rival. I propose, therefore, to discuss the diesel engine in terms of power plants of up to, say 6,000 horsepower, and I am going to urge that plants up to this size should be composed of a very large number of very light high-speed units.

Service Is Easier

When suggesting to any shipbuilder the use of light high-speed engines in preference to the large heavy slow-speed engine, I have always been answered that their use would be quite out of the question because, although they may perform satisfactorily on land, they could not possibly face the hardships of a seafaring life. I am told that a marine engine is required to run year in and year out at its maximum power and that, unlike the conditions of land service, it has to be capable of running on insecure foundations with doubtful alignment. To these criticisms I would reply that the marine engines does not, in fact, run for a greater number of hours than, say, a motor bus engine. He would be a happy shipowner indeed who could keep his vessel at sea for 4000 hours per year, while the average motor bus runs for fully 5000. As to running at full power, I contend that no large marine diesel engine ever runs at full power or anywhere near it. In the first place, the so-called full power rating at which the initial speed trials are run, corresponds in an unsupercharged four-cycle engine, to only about 75 pounds per square inch brake mean pressure, yet any self-respecting diesel engine, of the high-or-low-speed type, can quite easily develop well over 95 pounds per square inch with good economy. Even the rated full power, therefore, is barely 80 per cent of what the engine is really capable. Again, though I have travelled thousands of miles in large motor ships, in no single instance has the average of the day's run fallen short of the trial speed by less than 10 per cent. The deficiency has usually been nearer 20 per cent. As to the insecure foundations and dubious alignment, I would retort that I have never been able to discover that the marine engineer has taken any action in the design or mounting of diesel engines to meet this difficulty. The high-speed engine, on the other hand, being far more rigid and entirely self-contained, can be so mounted as to require no foundation, and it looks after its own alignment problems. Compared therefore with many of the services in which the small high-speed engine is already employed, that of ship propulsion would appear to be relatively easy, the more so since the speed will be nearly constant and overloading non-existent.

One is told that the first essential of any form of marine propulsion is absolute realibility. As a frequent passenger on ships, I can but agree wholeheartedly. Many factors must be combined to achieve reliability, of which the most important are prolonged experience and meticulous attention to detail design, but even so, no prime mover made by man can ever hope to be 100 per cent reliable. We must face always the possibility, however remote, of a serious breakdown, and security can be found only in numbers. With two or three engines, security is increased enormously, and when the number of engines runs far into double figures as I am suggesting, security is virtually infinite, however frail the individual units may be.

Although marine engineers may be justly proud of the reliability of the modern marine engine, yet no patient in a nursing home ever received such devoted care; day and night it is tended, coddled, and dosed, its temperature taken and its pulse felt by relays of doctors and nurses. I am going to suggest the other extreme, that the high-speed engines should be placed in cells, padlocked, and keys left ashore. Should an engine break down on the voyage, a chalk mark on the door of its cell will suffice for the time being, and the inquest will be postponed till the ship returns to its home port, when any engine casualties, as well as those due for overhaul, will be removed bodily and exchanged for reconditioned ones. The removal and replacement of perhaps twenty such engines could be done in a few hours only, and the ship need never be out of commission due to engine trouble.

The most important, and also the most difficult, problem we shall have to deal with will be that of the transmission of power from a large number of mechanically independent units to a single propeller shaft. I say mechanically independent because it is, I fear, quite out of the question to contemplate gearing a large number of units to a single shaft; the objections to this are, I think, fairly obvious. In the first place, it would involve stringing the engines out along in the propellor shaft. In the second place, it leaves the reversing problem in the air, or at least, involves it in intolerable complication. Thirdly, unless some elaborate system of automatic clutches be provided, the independence of the units, and therefore the reliability of the power plant, will be destroyed. We are left, then, with some form of fluid transmission, either oil, air, or electricity, and of these electricity appears to be the most practicable one.

The Type of Engine

The type of engine I would propose for such a purpose is that which has now been developed for heavy road vehicles. I would advocate this type because it has attained a far higher degree of mechanical perfection than any other; moreover, in regard to most of its running parts, it has now become largely standardized, so that replacements are al-

*An abstract of the sixth Thomas Lowe Gray lecture, on *High Speed Diesel Engines for Marine Service,* delivered by H. R. Ricardo, B. A., F. R. S., M. I. M. E., Dec. 1, 1933, before The Institute of Mechanical Engineers, England.

ready very inexpensive. It would require modification in certain respects, but no modification I would insist, which would affect any of its well tried moving parts.

The output of such engines ranges up to 150 horsepower at 2000 revolutions per minute or rather more; operated at, say 1600 revolutions per minute they would each develop 100 horsepower at a very comfortable load factor and with good economy. Such engines, however, are burdened with a great deal of auxiliary mechanism essential for road service. This adds considerably to their cost and could well be dispensed with. I think it will be found, even at this present early stage, that there are many manufacturers of commercial vehicle engines who would gladly accept £3 per horsepower for a bulk order for such engines. Each engine would be coupled to an electric generator which would be bolted direct to the flywheel housing, thus forming a self-aligning unit.

This particular engine, which is typical of its class, was designed for the larger and heavier types of commercial vehicle, and is of more than usually robust build. It is capable of developing a maximum of 170 brake horsepower at 2400 revolutions per minute or 120 brake horsepower at 1600 revolutions per minute. Its weight, is just under 1500 pounds, or say 15 pounds per horsepower at its most economical rating of 100 brake horsepower.

Let us consider now the case of a relatively large vessel requiring, say, 5000 actual shaft horsepower for propulsion and, say, 1000 horsepower for auxiliary and hotel services. For such a vessel I would advocate installing a total of 75 high-speed diesel-electric generating sets, each of about 100 horsepower when running at 1600 revolutions per minute. Allowing for a 14 per cent loss in the electric transmission (which I think is an outside figure), we shall need a total of 57 generating sets for propulsion, 10 identically similar sets for auxiliary services, and, if the ship is going to be very long away from a home port, it may be advisable to carry perhaps eight more as spares, giving a total of 75 sets all identical and interchangeable. The overall dimensions of each set will be approximately 6 feet 6 inches long, 2 feet 6 inches wide, and 3 feet 6 inches high; each will weigh slightly under 1½ tons.

Engines Drive Generators

Since each generating set comprises a six-cylinder engine with extremely light moving parts and balanced both as to its primary and secondary disturbing forces, no foundation will be required, but, in order to eliminate entirely any trace of third order vibrations or torque reaction, I would suggest that each set be insulated from the ship's structure by the introduction of a resilient but well damped mounting, such as is now customary in the case of motor car engines. I would suggest that the engines be placed in rows and in several tiers, one above the other. So far as their operation and mounting is concerned, their position in the ship is immaterial, but for the sake of the wiring and pipe work, it will, of course, be convenient to group them together as closely as possible. It is also an essential part of the scheme that they shall be so placed that they can readily be slid and lifted out of the ship by a deck hoist.

For reasons which I will explain later, each generating set, or possibly each pair of generating sets, will be enclosed in a box whose capacity will be approximately 60 cubic feet. The entire power-generating plant, both propelling and auxiliary, together with eight reserve sets, will be represented in effect by about 110 tons of rectangular packing cases, each of 60 cubic feet capacity, which may be stowed wherever convenient, having regard to accessibility, to unloading and to pipe work—clearly a very small bulk and weight as compared with the usual power-generating plant.

The supply of cooling water, of lubricating oil, and of fuel oil will be served out to each set from a central distributing system, with pumps in duplicate, or even triplicate, in order to ensure absolute reliability. Each generating set will have its own electric starter operated from a push button on the bridge, and this is a point which I wish to emphasize: once up to speed, it will immediately and automatically cut into the circuit and run always at a constant speed and constant load. Except for the speed governor, there will be no engine control whatever. Each propelling set will either run at the full capacity of its fuel injection pump, or not at all, and the ship's speed will be varied primarily by cutting in or out more or less of the generating sets, never by varying the load on individual sets.

I am no electrician, and the advice I have gleaned from electrical engineers with whom I have discussed the problem, has been so diversified and so contradictory that I am little the wiser for it, but I cannot think there will be any insuperable difficulty in coping with the switchgear, whether the armatures of the generators are coupled in series or in parallel. There are, I appreciate, a dozen different ways of linking up the individual sets electrically, involving alternating current in combination with rectifiers, or direct current, with the generating sets either in series or in parallel; each apparently has its attendant advantages and disadvantages. But whichever method be adopted, I would insist that the complete independence of the generating sets should be maintained, and that each should be free to cut automatically into the circuit, so soon as the engine has built up speed and voltage, and to cut out as soon as there is any reverse flow of current. Such switchgear as is required should be restricted almost entirely to the propelling motors.

So much for the general scheme. I would like now to go into a little more detail and to forestall, as far as I am able, the criticisms which will be levelled at it; the first of which will, no doubt, be the cost of maintenance. A large fund of experience is now available as to the maintenance of these small high-speed engines in road service. This is a much more arduous service in almost all respects, in that the engines are required to run normally at much higher speeds than I have suggested, namely, 2000-2200 revolutions per minute as against the 1600 revolutions per minute. I am proposing; they are constantly being started and stopped, constantly being overloaded till they are brought almost to a standstill, and are often left for long periods running idle and cold. These are hardships from which they will be free on the sea. In such engines, the principal wearing parts are the cylinder liners, the piston rings (more particularly the oil scraper rings), and the big-end bearings; other wear is trivial. The rate of wear per hour as actually measured in these small high-speed engines is no greater than in the large slow-running types. But in consequence of their smaller size, less wear can be tolerated; renewals must therefore be more frequent but much less expensive. On balance, it will, I am satisfied, be found that the cost of renewals is far less than that of the large slow-running engine, while the ship need never be out of commission owing to the necessity for repairs or renewals to the power-producing plant.

A Total of 75 Engines

In the ship I am picturing, there will be a total of 75 engines, but not much more than half this number in operation will suffice for ordinary cruising speeds and for dealing with the auxiliary service. If the ship is at sea for 4000 hours a year, then each engine will, on the average, be in operation for 2000 hours per year only. I would suggest that, after this period, it be removed for a top overhaul in a properly organized shop where, as a matter of routine, it will be decarbonized, the oil scraper rings and valve springs renewed, the valves ground in, valve tappets and injectors adjusted, and the fuel injection pumps recalibrated. After the next 2000 hours the piston rings should be renewed, but not till after 8000 hours, or four years, should anything in the nature of an extensive overhaul be required, when the crankshafts will require regrinding, the

cylinders relining, and new pistons, valves, etc., should be fitted.

The cost of renewals at this stage will amount to perhaps 15 per cent of the cost of a new engine, and the entire cost of reconditioning, including fitting, testing, etc., if made a matter of regular and well organized routine, may amount to from £50 to £60 per engine. Allowing, therefore, for three top overhauls to one major overhaul, the cost of routine repairs and maintenance should average from £100 to £120 per engine in four years, or say, £25 to £30 per annum. To this must be added perhaps an additional 30 per cent to cover the hazards of accidental breakdown, making a total of about £2500 to £3000 per annum for all engine repairs and maintenance in a ship of about 10,000 tons, in which the total installed horsepower is 7500, the actual shaft horsepower at full speed 5000, and whose seagoing average is 4000 hours, or say, 60,000 miles per annum. Not a very high figure, I think, more especially when consideration is given to the fact that throughout its whole life, the ship will never be out of commission for one minute for engine repairs, and that the routine overhauls will maintain all the engines in new condition and at maximum efficiency until obsolescence, not age or wear and tear, brings their lives to a close.

Undertaking the Maintenance

In this connection I would mention that some of the manufacturers of high-speed diesel engines for road vehicles are already undertaking the entire maintenance of their engines, including replacement with new engines when necessary, and including also the maintenance of all the engine auxiliaries, of the entire electrical equipment and batteries, at little more than the rate I have mentioned. As to the maintenance cost of the electrical gear, I am not, I am afraid, in a position to offer any figures, but since no batteries are involved, it is reasonable to suppose that it will be relatively very small.

Within the engine itself, the lubrication system will be exactly as in a road vehicle engine, that is to say all bearings will be fed by pressure in the usual manner, with the usual large-diameter drilled passages in place of oil piping wherever possible. Each engine of 100 horsepower will require approximately 3 gallons per minute for the dual purpose of cooling and lubricating the bearings, so that the capacity of the oil circulating system should be about 200 gallons per minute.

The fuel system should be similar to that of the lubricating oil, except of course, that no cooler is required. In order to ensure against gassing or air locks in the fuel pumps, it is always preferable to maintain a continuous flow through them, but of course quite a low velocity will suffice. As in the case of the lubricating oil, the circulation of fuel to each individual engine will be interconnected with the starting of the engine. In like manner, both the air intake and exhaust from each engine should be connected to ring mains, the latter of course water-cooled.

With such a system, it may well be worth while to apply a supercharge and so raise the whole power of the plant by about 20 per cent, since this could be accomplished so easily by a single large centrifugal blower.

The whole of the engine commissariat system will, of course, be operated electrically, and all vital or vulnerable parts should be in duplicate. The total power consumption of the engine auxiliary services, if in duplicate, will amount to somewhere about 50 horsepower or about 1 per cent of the shaft horsepower, excluding supercharging.

Although I have reckoned on a normal maximum shaft horsepower of 5000 with ten engines engaged upon auxiliary services, and eight in reserve, it is probable that in most services four or five engines will suffice for the auxiliary work when at sea, so that as many as seventy engines could at times be pressed into the work of propulsion, giving a normal shaft horsepower of 6000. If supercharged to increase the output by 20 per cent, and setting aside the use of two engines to drive the blowers, a maximum of just over 7000 shaft horsepower could be attained in emergency with all generating units in operation and supercharged.

Noise.—To the marine engineer's ear, the continuous high-pitched roar of the high-speed engine is perhaps quite as distressing and almost as unnerving as is the gasp and shudder of the slow-speed type to ears accustomed to the former. There is, however, this essential difference, that whereas by proper insulation, the roar of the high-speed engine can be smothered, more especially so when the air intake is muzzled, that of the slow-speed, emanating as it does from the hurtling about of unbalanced tons of metal, cannot be isolated in this way but reacts throughout the ship.

In Soundproof Wooden Box

In order to cope with the noise difficulty, and at the same time to discourage any meddling with the engines by those on board, I would propose that each generating set or pair of generating sets should be enclosed entirely in a double-walled wooden soundproof box, well ventilated by connection to deck ventiltors, or even a false funnel. This box will rest on the ship's structure entirely out of contact with the engine or its mounting. A glass window should be provided in each box through which an occasional visitor to the engine room can see the commutator of the generator, a thermometer on the exhaust pipe, possibly, though not necessarily, an ammeter, and the crankcase air vent; the amount of smoke from the latter will reveal the general condition of the piston rings and indicate when the time is drawing near for a top overhaul.

Thus enclosed, the generating sets will sound like bees on a summer's afternoon, and the solitary engine room clerk will be able to smoke his pipe of peace. Since the fuel injection pumps will have been calibrated ashore and set to give a maximum delivery sufficient for 100 horsepower only, at 1600 revolutions per minute, there can be no possibility of overloading, and I would insist that any adjustment to the fuel pumps or governors be sealed, lest some engineer cracksman succeeds in breaking and entering the engine's cell. All engines should, I suggest, be started and stopped by means of a remote control, either from the main switchboard or the bridge. Lights on the switchboard and in each engine cell will indicate which engines are in operation at any moment. The engine room clerk will be expected to keep records of the number of hours run by each generating set, of the total fuel and oil consumption, and it will be his business also to take an occasional stroll around and to chalk-mark for the benefit of the engineer ashore, any set which is persistently showing an exhaust temperature much above the average or which is showing excessive fuming from the crankcase breather.

Mounted in Trunnions

I would propose that each combined engine and generator should be mounted in trunnions fore and aft on a very light pressed steel or tubular subframe, in such a manner that it is free to rotate about its own crankshaft and thus balance its own torque reaction. The angular rotation would, of course, be limited by a spring-loaded torque arm and any oscillation damped by means of a damping disk of large radius, as in a Lanchester torsion damper.

In this manner, each engine unit would absorb entirely its own disturbing forces and would transmit as little vibration as a really well-balanced electric motor. The subframe would form an integral part of each generating set by which the whole unit would be slung when lifting, and by which it would be slid into and clamped into position in the engine room.

The ship's structure would then be called upon merely to withstand the dead weight of each generating set, a matter of about 1½ tons only; for no unbalanced forces or vibration will be imparted to it, nor will it be called upon to play any part in the alignment of the engine or genera-

tor. The soundproof box will be carried on the ship's structure so that it surrounds, but is completely out of contact with any part of, the engine. I have perhaps labored the question of engine mounting, but in such a scheme as I am proposing, it plays an important part in that, given proper attention, it should be possible to eliminate entirely all trace of vibration.

In road work, the study of engine mounting from the point of view of eliminating vibration and noise, is becoming a fine art. In such marine installations as I have examined this aspect of the question appears to have been neglected sadly. I have had the misfortune to travel severa. thousand miles in a large and much advertised motor ship in which three or four large four-cylinder auxiliary engines were all attached rigidly to a pair of girders running athwart ships. When their large unbalanced secondary forces got into step, as they did every two or three minutes, the vibration throughout the whole ship was shattering.

Another criticism which I foresee will be levelled at me is that the fuel and oil consumption of such an equipment will be excessive. If this is so, of course the scheme will lose much of its charm, but I think I can show that it will not be appreciably, if any, higher than that of a direct driving diesel plant. In the first place, thanks to their high speed, their light moving parts, and perfect alignment which ensures low internal friction, the specific fuel consumption of these small engines is at least as good as, and usually even better than, that of the large slow-running type.

The efficiency of the diesel engine gains nothing with size, and small six-cylinder engines of about 100 horsepower can maintain a fuel consumption of well under 0.4 pounds per brake horsepower hour over a wide range of load or speed and over very long periods. The Gardner commercial vehicle engine, to take a good example, has in ordinary everyday service a fuel consumption of only 0.37 pounds per brake horsepower hour when driving the whole of its auxiliary mechanism, and even better results than this can and would be obtained under the very favorable running conditions I am providing for. What large slow-speed engine can better this? After 2000 hours without a top overhaul, the consumption will have increased from 0.37 to about 0.39 pounds per brake horsepower hour.

I have suggested that the mean overall efficiency of the electric transmission will be 86 per cent at cruising speeds which will give a fuel consumption of 0.442 pounds per actual shaft horsepower hour.

Although the lowest consumption, in terms of shaft horsepower, of my multiple-engine proposal may not be quite so low as that of the large direct driving plant under favorable conditions of speed, yet in my proposal this same consumption will hold good for all speeds from dead slow to full speed (excepting only in so far as the efficiency of the propelling mototrs will vary slightly with speed). So far as the generating sets are concerned, the consumption per kilowatt-hour will be entirely unaffected by any variation of load from less than 2 per cent upwards.

With regard to lubricating oil consumption, this ranges from 1/300 pounds per horsepower hour when the oil scraper rings are new, to about 1/150 pound per horsepower hour after 2000 hours, say an average 1/20 gallon per hour for each generating set. Under the operating conditions I have envisaged the very cheapest lubricant procurable will be all that is needed. If we take 4000 shaft horsepower as the normal cruising condition, then the fuel and oil consumption of the propelling engines will be approximately 14 tons and 50 gallons per day respectively.

I have stressed the argument that all engine repairs and overhauls should be carried out ashore in a properly organized and equipped maintenance shop where, since, all engines are identical and all parts interchangeable, the work can be undertaken as a continuous routine. There is no reason, however, why the repairs and maintenance should not be carried out on board, for the staff and equipment needed are extremely small. Where a ship is leading a purely vagabond existence this may be necessary; but in the case of ships which visit their home ports at regular intervals, it will—obviously I think—be preferable to save the space and hands and to keep the maintenance shop ashore.

Passengers Carried

From the Italian line the following information has been received on passengers carried in sailings of vessels of that line during the first half of February.

The REX sailed from New York for Italy on Feb. 3 with a total of 600 passengers. The SATURNIA sailed from New York Feb. 8 on a 17-day Caribbean cruise with a capacity passenger list of 400, while more than 150 prospective passengers were unable to obtain the accommodations desired.

The ROMA sailed from New York on Feb. 10 for a Mediterranean cruise with a total of 500 passengers. On Feb. 13 the CONTE DI SAVOIA arrived at New York from Naples, Genoa, Nice, and Gibraltar, with 542 passengers. The same vessel sailed from New York on Feb. 14 on a 28-day Mediterranean cruise with 900 passengers.

Direct Subsidies Favored Instead of Mail Pay

That President Roosevelt recognizes the need of aid, in some form, to private American shipowners engaged in foreign trade was made clear at his conference with the press on Feb. 14. The President reiterated his conviction that aid is necessary to meet cost differentials in the operation of American and foreign vessels. He desires, however, that this aid shall be given under its true designation as straight subsidies. He believes that without aid to offset these cost differentials American ships will be forced off the seas where they are in competition with foreign flag vessels. He thoroughly appreciates the essential part that an American merchant marine has in promoting the foreign commerce of the country and as auxiliary to the navy in a national emergency.

Director Heimann of the shipping board bureau at the request of Secretary Roper has been making a thorough investigation of the individual ocean mail contracts. When all the facts have been developed a plan is to be worked out for the adjustment of shipping subsidies to strengthen and build up the merchant marine, the object being to accomplish this with a minimum amount of public funds. It is likely that Mr. Heimann's report, which is to include a study of actual operating cost differentials between American and foreign ships, will also propose a program of consolidation of steamship companies into perhaps six groups. This would materially increase the effectiveness of the lines in each group in developing a more efficient service.

The committee headed by Senator Black which has been investigating ocean mail contracts, it is understood, will continue until the affairs of every mail line has been thoroughly scrutinized. So far only about 12 companies holding mail contracts have been investigated. There are some 46 ocean mail contracts now in force. It will take at least three months longer for the senate committee to complete its inquiry.

It is evident that the shipping policy of the administration does not differ from the preceding administration in its vigorous support of the merchant marine. The difference is in the method by which this objective may be most effectively accomplished. Whatever legislation may be necessary to carry out the plan to be worked out, will undoubtedly be passed promptly when it is submitted by the President.

The Ward Line has announced that arangements have been completed to operate the new turbine electric liner MORRO CASTLE on a special Easter cruise, sailing from New York March 29 for Havana, Miami and Nassau, and return to New York on April 9.

ELECTRIC WELDING,

Construction of Tank Barge Peter G. Campbell

BY NORMAN M. HUNTER*

THE PETER G. CAMPBELL described in this paper, is the largest ship up to the present time constructed entirely by the electric arc welding process in this country; not a single rivet is used in any part. She was built to the order of Dominion Tankers Ltd. for carrying petrol and light oils in bulk on the Great Lakes and canals of Canada, and is a ship 179 feet long by 34 feet broad by 15 feet deep, carrying 1620 tons on a draft of 12 feet 6 inches. She is classed by the British Corporation Register of Shipping and Aircraft and is built on the longitudinal frame principle, the cargo being carried in four main holds, each having a longitudinal oiltight bulkhead on the center line, thus making a total of eight cargo compartments or tanks.

The pump room is situated at the after end of the ship and contains steam-driven machinery capable of dealing with 150 tons per hour, the steam for this purpose being supplied from shore lines as no propelling machinery or boilers are fitted in the ship, which has been arrnaged for being towed. From the pump room there is led an 8-inch main pipe line for dealing with the oil cargo, with 6-inch branches led to suctions in each cargo compartment. A complete equipment of gas-freeing, heating, and fire extinguishing pipes, as usual in tanker practice, is also fitted.

Accommodations for Crew

The crew is accommodated in well lighted and comfortable quarters at the after end of the ship, and for ship lighting a motor driven dynamo is placed in a separate compartment near the pump room aft.

The deck equipment consists of hand power windlass forward with two stockless anchors carried in pockets in the bow, as is usual in lake ship practice, with watertight cable lockers built in the fore peak. A hand power capstan is fitted on the deck near the after end of No. 4 cargo tank, and the twin-coupled rudders are controlled by hand power steering gear. Two steering wheels are provided, one being inside the navigating house for use in exceptionaly bad weather. There are two hinged masts or derrick posts placed near the after end of No. 4 tank with a steel derrick on each capable of dealing with weights of 20 cwt., and worked by the capstan.

The lines of the ship are, like those of many lake ships, exceptionally full, the coefficient being .89, which gives extreme curvature with rather difficult shell plate shaping work at the ends of the ship, and at the ends of the round bilge where it curves into bow and stern plating. The deck is straight from end to end without sheer and is peaked in the center, sloping in a straight line from the center to each side instead of being cambered.

Welding to Reduce Weight

To reduce weight of structure to a minimum, and to achieve the maximum strength necessary to carry the maximum weight of petrol and light oils within the dimensions allowable, it was decided to electric weld the complete structure. Built-up welded fittings were also substituted for all heavy castings such as hawse pipes, mooring and towing bollards, etc. The design of the structure was given special consideration from a welding point of view, the latest and best methods that had been proved by experiment and test being embodied therein. So far as was possible the construction was arranged for most of the welding work to be done in the shop on skids, as downward is the easiest and most satisfactory position in which to deposit the weld metal.

The method of construction is on the longitudinally framed principle with frame and stiffener flanges to plating eliminated, and edges of heavy plating connected by butt welds, instead of overlaps. Each bulkhead was arranged for welding complete in one piece on the skids ready for erection in the ship, as were also the transverse web frames.

The deck plating and straight portion of side shell plating were arranged in large panels for welding complete on the skids ready for erection. Each panel was in length equal to the length of a tank compartment, the transverse butt being kept about 2 inches clear of the bulkhead, the deck panels being in breadth from center strake to stringer plate, and the shell panels being in depth from sheer strake to upper edge of bilge plate.

Deck Plating

The center strake of deck plating was in one length from hatch to hatch and the deck stringer and shell sheer strakes were formed of one plate flanged along the deck edge with the butts arranged clear of the deck and shell panel butts. The bilge plate was a rolled plate, as is usual practice with the butts arranged clear of the vertical side shell panel butts. The fore end of the deck plating was arranged and worked complete as one panel from forward bulkhead to stem, and the after end of the deck was also worked complete as one panel. The stem is a flanged plate in one length from the bottom of forefoot to the top of the bulwark plating, and attached to longitudinal frames by breasthook bracket plates.

Longitudinal frames are of angle section, the toe of the angle being welded direct to the shell plating, and are in length equal to that of one compartment, their ends being a tight fit and welded to the transverse bulkhead plating. On one side of the transverse bulkhead the longitudinal frame was a steel-tight fit to the plate, and on the reverse side of the bulkhead a plate pad was tightly driven in between the end of longitudinal frame and bulkhead plate, thus giving a thoroughly steel-tight joint before welding. The transverse bulkheads were plated horizontally, the plates being in one length from side to side of the ship, and the bulkheads three plates in height. Angle stiffeners were arranged horizontally and spaced opposite the longitudinal frames to which they were connected at the ends by small rectangular plate brackets.

Longitudinal bulkheads were plated fore and aft with plates in length equal to the full length of each compartment, and were three plates in height. The breadth of plates was such that their seams did not come opposite the seams of the transverse bulkheads. The stiffeners were arranged in a similar way to those on the transverse bulkheads, and were connected at the ends to the trans-

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Reprinted from paper, entitled *The Electric Welded Ship, Peter G. Campbell,* read by Norman M. Hunter before the Northeast Coast Institution of Engineers & Shipbuilders at Newcastle-on-Tyne, England, Dec. 1, 1933. With the exception of the welding specifications and references to illustrations, the text of this paper is given here in full. A number of illustrations accompanied the paper as presented.

verse bulkhead stiffeners with small rectangular brackets.

Bulkhead Connections

No angles were used to connect longitudinal bulkheads to transverse bulkheads, shell, or deck plating, the joints being butted and fillet welded in all cases. The same remark applies to transverse bulkhead connections to shell and deck, except in the case of the forward and aftermost bulkheads, which had boundary angles welded on so as to give some latitude for fitting the difficult-shaped plates at bow and stern of ship. With flanged deck stringer and sheer strake plates, also round bilge plates, allowance for fitting purposes was taken care of by making top and bottom side longitudinal frames with flanges to shell plating and lapping these sheer strake and bilge plates on to the flange.

Made Careful Welding Tests

Careful tests were made on test pieces representing every type of joint to be used in the ship, constructed of the same quality of material as that to be used in the ship. These test pieces were welded by yard operatives in positions and under conditions approximating those likely to be found in the actual operation of building. "Quasi-arc" electrodes were used and the welding was done at different amperages and different lengths of deposit till the best average result was attained in each case. From these results a complete welding specification was arrived at, and rigid adherence to it was enforced in the carrying out of the work.

In this connection it is interesting to note that for all butt joints, such as bulkheads to shell and deck, and to each other, our tests and experiments showed that single runs of fillet welding done with No. 10 mild steel electrode at 7½-inch to 8-inch deposit per electrode, would have given sufficient strength, but to insure oiltight connections, particularly in overhead and vertical work, we decided to use double runs instead of single. For all connections where we expected maximum stresses, such as longitudinal bulkheads to shell, longitudinal bulkheads to transverse bulkheads, vertical butts of shell, bilge plate butts, transverse butts of keel and deck panels, we decided to use electrodes of uranium type which showed under test the greatest strength.

Representative Tests Made

The tests were all representative of the attachment of longitudinal bulkheads to transverse bulkheads. The vertical pieces were the longitudinal bulkheads which are butted to the tarnsverse bulkheads and fillet welded with double runs on each side. The tests were carried out by fastening down the transverse bulkhead portion to castiron blocks, and the longitudinal bulkhead part was bent over a frame setter's bevelling wheeze tool, and then in two cases hammered down; in that of one test all parts were bent by hammering, but in no instance did the welding give way.

I think it will be admitted that riveting construction would have some difficulty in standing up to such tests as this. Two of the test pieces represented bend tests across the center of the weld to test the ductility and elongation of the weld metal. One test piece was pulled, in the direction of the longitudinal bulkheads, to destruction, and the parent metal gave way while the welding remained intact and undisturbed.

These are only a few of the tests carried out for, as stated above, test pieces were made for all joints in the ship to ascertain the best welding specification, and in no case was a method of welding accepted that did not result in a strength of joint equal to 26 tons per square inch of plate section.

Precautions Against Distortion

As the plating was fairly heavy, being about .34 inch thick, no serious distortion troubles were anticipated nor experienced in carrying out the work. From experiments carried out it was found that keeping the veed butt seams about 3/32-inch wide allowed the plate edges to close, and no shrinkage in either length or breadth of the plates themselves took place. Consequently all plating was worked to exact full size over the bottom of the planed 70-degree veed edges, and when welded up the overall dimensions were correct. The welding of the toe of stiffener to the plate was inclined to curve the work in a slightly hollow way as the horizontal flange of the stiffener remained cold and unexpanded, whereas the welding of the toe heated that flange and expanded it, so curving the stiffener which was held in that position after welding by the heavy and rigid plate.

This was overcome by cambering the stiffeners to the extent of 1½ inches in 34 feet of length, and slightly wedging the plating up to the stiffener when fastening it to the plate preparatory to welding. No other serious distortion troubles were experienced, and the finished work was as fair as the best riveting work. A series of welding skids was constructed consisting of heavy channel bars welded together.

On these skids the plates forming the bulkheads, shell, and deck panels were laid. No fastening down was found necessary owing to the thickness and weight of plates.

Construction of Bulkheads

The plates were mangled, then lined off, and planed to exact length and breadth. The ends were left square for fillet welding, and the seams were planed to a 70 degree angle in accordance with British Corporation rules, the breadth over bottom V being the exact full size of the plate, and the top of V being on stiffener side. The angle stiffeners were punched for ventilation and drainage. The plates were carefully placed on the welding skids with 3/32-inch opening at bottom of V, and the seam directly over a bar of the skid. Temporary lugs were tack-welded to the plates at either side of the Veed butt for drawing up and holding the plates in position, and temporary wedging pieces were tacked on where required to bring the plate edges fair. These temporary wedging pieces were made from ⅜ inch 3 inch flat iron.

The procedure of welding was as follows: First, the seams were tacked from center to each end at intervals of about 15 inches. Then two welders started at the center of seam and welded away from each other towards the outer ends, releasing the tack nearest the end when they came within easy distance of it, as the contraction of the weld metal tended to make the plates bend slightly. So as to make the apex of the V project below the surface of the plating a slight distortion was given in the opposite direction by placing rollers weighing about 2 cwt. each side of the seam. These rollers were pushed along by the welder immediately in front of the spot he was working at. On completion of the first run the welding was thoroughly cleaned and inspected. The second run was then started from center, and like the former, was worked towards the outer ends. This was then cleaned and inspected, and the third or succeeding runs where necessary were done in similar manner.

Stiffeners Placed in Position

When the seams were welded the stiffeners were lined off and placed in position. These were held in place by temporary bolts tack-welded at intervals to the plate on either side of the stiffener, and a flat bar was screwed down on the top, a wooden block being placed below the horizontal flange to hold the angle bar stiffener plumb to the plate. The toes of the stiffeners were not planed and were welded direct to the plate by intermittent welds 8 inches long on alternate sides of the flange, the procedure being to start welding in the center of the length of bar and weld alternately each side of the flange towards the ends. The alternate 8-inch welds were arranged to overlap each other to the extent of ½-inch.

At the end of the stiffeners the welding was doubled, that is, it was returned on the other side for 3 inches. As time was of great importance in this contract many of the stiffeners were welded to the plates

before the plate seams were welded, and it was found that no difference was made so far as distortion or shrinkage was concerned by either method.

When the veed seams and stiffeners were welded, temporary lugs were tackwelded on at intervals, about 3 inches in from edges all round for bolting up in position in ship, and lifting plates were tack welded on the top edge to take crane slings for lifting into position. The bulkhead was then turned over on the skids and light bead weld was run on the apex of the veed seams after cleaning. The webs were then placed in exact position and fastened with temporary tacked on bolts, in a somewhat similar manner to the angle stiffeners above mentioned. The procedure here was to begin in the center of the length on either side with two welders working opposite to each other, and weld a light continuous fillet each side to the end, beginning in the center again and welding in a similar manner to the other end. In way of plate seams welding, these runs were stopped about 1-inch each side. By laying down the fillets at the same time opposite each other the possibility of canting the web by the contraction of the weld metal on one side was avoided and the webs kept square to the plate.

Deck and Shell Panels

The preparation of material for these panels was similar to that for bulkheads, except that the V's for outer edges of panels were planed with the apex of the V on the same side of the plates as the longitudinals, so that these welds might be done downwards in the ship after erection. The procedure of welding on the skids was similar to that mentioned above for bulkheads.

The preparation of shell panels was similar to that for deck panels, the V's of the vertical outer edges being planed with the apex on the inner side so that these butt welds could be made from outside of ship after erection. The bottom edges were planed square for fillet welding to bottom longitudinals. The bottom longitudinal having a flange to the shell for ease of fitting bilge plate was welded to the shell panel on the skids, thus avoiding an overhead weld in the ship, and making the weld of bilge plate to this longitudinal flange a downward weld in the ship also. This joint was left wide on the longitudinal flange and covered by the cope iron rubbing strip. The tops of panels had a chamfer taken off the outer side to facilitate the overhead fillet weld on the bottom edge of sheer strake to flange of longitudinal. As there was no rubbing strip in this position it was considered necessary to make this weld flush for appearance sake and consequently the width was curtailed to the minimum necessary to get a good connection to the longitudinal flange.

The procedure of welding these panels on the skids was similar to that for bulkheads. The web frames were prepared in the usual way, except that no connecting holes were punched. The joints in this case were overlaps. These were laid down on the skids, and to allow for contraction on the overlap welds the overall dimensions were increased by 1/16-inch each way, which was proved by experiment and did, in fact, bring the webs to the exact dimensions when finished.

After being carefully tack-welded the dimensions were carefully checked, and when found correct all joints were welded on top side; the web was then turned over and welded on the other side. Continuous fillets being welded in all cases.

The crew's deck house is of light plating and was prepared for lap-welding, the overlaps being in breadth equal to 3 times the thickness of the plate. The sides, top and bottom, and divisions were laid out on the skids and fillet-welded. They were then put together and tack-welded, the main welding being done downwards, the whole house being turned over by crane into positions to allow this to be done. After all welding was completed the house was filled with water to a depth of 3 feet and tested, no leaks being found.

Erection of Ship Structure

Building blocks for the keel were prepared in the ordinary way and a cradle consisting of railway rails was erected to support the bottom shell plating. The railway rails were laid in length from keel blocks to bilge, and in way of the longitudinal shell plate edges strips of flat iron were laid between and flush with the top of the railway rails. These were supported by wood battens, their purpose being to facilitate the welding and assist in keeping the seams of plating fair. The keel plates were laid on the blocks and faired in the usual manner so far as center line was concerned, but they were not connected to each other by any rigid means. The welding procedure was as follows:—

In the center of the length the butt was spaced at 3/32-inch wide and tack welded in the center and at the outer edges, care being taken that the plates did not get out of true line. Two welders then started in the center of the butt and worked the first run towards the outer edges. This run was then cleaned and inspected, and subsequent runs were put in similarly. As the ends of these plates were not fastened the butt was free to contract and strains were thus avoided. After the center butt of the keel was welded the butts immediately forward and aft were welded and so on. In this way each butt was free to contract as the plates were in no way tied.

Welding Bottom Strakes

When the keel was all welded up the bottom strakes of plating were laid on the cradle and the procedure of welding was very similar to that at the keel. The garboard strake, each side, was welded first, the center butt being welded then the plate edges of these two plates welded to the keel plate by two welders starting at the welded butt and working away from each other towards the ends of the plates. These operations were carried out on each side of the keel simultaneously so as to avoid the possibility of the keel plate being thrown out of line which might happen if heated by welding on one side only. After the longitudinal seams of these two plates were welded to the keel plate the next butts were welded, then the keel seams of those plates, and so on to the end of the strake. All the shell bottom was welded similarly so that contraction was allowed to take place in each butt, and in the longitudinal seams freely, so as to avoid as far as possible, locked up contraction stresses. The heavy rollers were used when welding the seams in similar manner to the skid welding.

When all the flat of bottom plating was welded up it was carefully lined off for position of bulkheads and longitudinal frames. The longitudinal frames were then placed in position and fixed by temporary bolts tacked on in a similar manner to the way the stiffeners were fixed to the bulkheads on the skids, and the welding procedure was also similar to that already described for bulkhead and panel stiffeners. At the ends of the longitudinal frames the welding was carried round for a distance of 3 inches and in way of the transverse web frames the welding was also doubled for 3 inches each side of transverse frame positions, as from a strength point of view the plating from bulkhead to transverse was reckoned as a panel, also the plating between transverses. Erection was then proceeded with as follows:

Erecting Bulkheads

The midship transverse bulkhead was erected and secured to gunwale ribbands in the usual way. Temporary lugs were tack-welded to bottom shell, close to the temporary lugs on the bulkhead, and secured with service bolts. Then three transverse web frames were erected on the port side forward of this bulkhead. The center line bulkhead 34 feet long, was then put in place followed by the three starboard side transverse web frames. The transverse bulkhead at fore end of the center line bulkhead panel was then put in place. These bulkheads

(*Continued on Page* 38)

Shipping Code Approval Is Expected Promptly

As this is written (Feb. 21) the approval of the final draft of a master code for the shipping industry is imminent. Joseph B. Weaver, who succeeded William H. Davis as deputy administrator in dealing with shipping, was hopeful that approval of the final draft could be made before March 5, the date set for a general conference of code authorities in Washington. Ira A. Campbell, counsel for the American Steamship Owners' association has been the chief representative of the industry in the negotiations which have been under way since the convened meeting on Jan. 31.

A number of changes in the proposed code as presented at the hearing in Washington on Jan. 31 have been agreed upon during the negotiations. Among these are full cooperation with the shipping board bureau and the interstate commerce commission in making the code effective. Some change is made in the matter of fixing minimum rates, but in the main the purpose intended was retained. A clause has been inserted specifically providing that no provisions of a code shall violate any United States treaty. Specifically also the code, "shall not affect the internal discipline of foreign flag vessels or the regulations of rights and duties of officers and crew of foreign flag vessels toward their vessels or among themselves, or their relations with their owners under contract made without the United States."

A different arrangement for a national shipping labor board appointed by the President for conciliation of labor disputes is proposed. It shall be made up of five members, two of which are to be appointed by the shipowning members, one by employers of labor engaged in the shipping industry on shore, and one each by the non-licensed and licensed personnel aboard ship.

To satisfy the objection raised by foreign flag interests to the method of voting for the code authorities, which called for 20,000 gross tons of vessels for each vote, it is now arranged as follows:

"If American and foreign flag vessels constitute part of the same carrying unit, then, if the gross registered tonnage of the American vessels exceeds that of the foreign vessels, the qualified vote shall be cast only with the American members of the division; otherwise, only with the foreign members of the division."

With reference to more effective utilization of the shipping board bureau and the interstate commerce commission in the operation of the code it is arranged as follows:

"In the administration of this code and any division or subdivision code the administrator shall utilize the assistance of the United States shipping board bureau, department of commerce and (or) interstate commerce commission to the fullest extent deemed advisable by him, through hearings, investigations or otherwise, and recommendations based thereon certified to the administrator in respect of rates, fares, charges, classification, rules, regulations, practices and other appropriate matters to the end that various branches of executive authority may be brought into effective coordination."

The scale for minimum wages for licensed officers and members of the crew has been increased but not to the point of the shipping board wage scale of 1929.

Canal Carriers Code

The first major water transportation code of fair competition which has been approved by the N.R.A. is that of the Canal Carriers association. This code covers the inland water carriers trading in the eastern part of the United States. The carriers operate on the New York State Barge canal and on the St. Lawrence river. This code will probably become a division of the master code of the shipping industry, reference to which has been made elsewhere on this page.

Members of the authority to administer the canal carriers' code were elected Feb. 19 and include William E. Hedger, Reginald G. Narelle, and S. W. Bullock, R. F. Lenahan and L. W. Lake. Stanley Carpenter was elected secretary.

Panama Canal Traffic

In comparison with the calendar year 1932, traffic through the Panama canal in 1933 increased 13 per cent in number of commercial transits. In 1933 the commercial transits were 4939 against 4367 in 1932. The increase in canal net tonnage was 11.1 per cent, or from 22,636,141 tons in 1932 to 25,251,759 tons in 1933. Cargo tonnage increased 16.9 per cent or from 18,099,938 tons in 1932 to 21,163,872 tons in 1933.

Tolls collected in 1933 amounted to $21,423,274 an increase of 8.8 per cent as compared with $19,685,672 in 1932.

Comparing 1933 with 1931 shows a decrease of 0.7 per cent in number of commercial transits; 1.2 per cent in canal net tonnage; 4 per cent in tons of cargo carried; and 4.9 per cent in tolls collected.

The low month of the year in transits and tolls for 1933 was February with 368 transits and $1,575,708 in tolls. The high month was December with 496 transits and $2,204,135 in tolls.

Arrange for Payments on Government Loans

In referring to government shipping policies under the new deal in the February issue of MARINE REVIEW mention was made of the purpose of Henry H. Heimann, director of the shipping board bureau, to obtain from shipping companies owing money to the government current payments due and to have past payments due amortized over a reasonable period.

It is understood that agreements under this program have now been made with five lines and negotiations are underway with a sixth line, which are in arrears and that hence-forth the government will receive out of the mail payment due these lines the current payments owing the government and also regular payments on account of past due installments.

In this way the government's interest is protected and is virtually guaranteed by the simple expedient of recapturing a part of the sum paid on mail contracts. This arrangement will have the effect of compelling the companies which are in arreas to exercise prudence in the use of their resources. Outside of the six companies referred to no other major lines receiving government subsidies are in arrears in payment.

The total amount now in arrears is $40,000,000, but Mr. Heiman pointed out that the payment of approximately $4,500,000 would settle the accumulated debt up to the present time. The larger amount includes all remaining future payments which are automatically considered to be in default as soon as any current payment due is not made.

It is believed that the plan will work out without undue hardship and actually to the best interests of both the government and the companies.

The companies with which agreements have been made, it was announced, are the Baltimore Mail Line, Atlantic Transport Line, Robert Dollar Co. Ltd., Tacoma Oriental Lines, and Munson Steamship Line, and an agreement with the Export Steamship Line is expected shortly.

On Jan. 29 the secretary of commerce on recommendation of Henry H. Heimann, director of the United States shipping board bureau, approved the award of the lease of the shipping board bureau terminal at Brooklyn, N. Y., to Piers Inc. This company was the high bidder.

The term of the contracts will commence March 1, 1934 and will end at 12 o'clock midnight on Dec. 31, 1936. Piers Inc. will be required to furnish a performance bond in the amount of $50,000, or in the lieu thereof, will be required to deposit government securities in the face value of $50,000.

Arcwear Full Load Trials Prove Successful

Full load trials of the ARCWEAR, first of the three Isherwood arcform cargo ships, were successfully held on Jan. 22. On the same day, the new vessel sailed from England to the River Plate with a cargo of coal. Order for the new vessel was placed with Short Bros. Ltd., Sunderland England, about a year ago. At the same time contracts were placed for two similar ships with the Furness Shipbuilding Co. Ltd.

A general description of these vessels and the nature of their design was published in MARINE REVIEW in the last December issue. Anticipated results from tank tests were also referred to in that article. Briefly these estimates were that the ships would do 11 knots on 21 tons of coal a day, 10 knots on 16 tons and 9 knots on 11½ tons.

In view of these estimated results it is interesting to note that the ARCWEAR, on full load trials, actually averaged 11.15 knots for 24 hours and consumed 20 tons of coal in that period. During the trial her mean draft was 22 feet 2 inches with a displacement of 9085 tons. The average indicated horsepower developed was 1417 and the average revolutions of the propeller were 64.44. When leaving for her trial the ARCWEAR had on board 1100 tons of bunker coal and 5586 tons of cargo coal, giving her a total deadweight including stores of 6850 tons.

Progressive speed trials over the measured mile in loaded condition, gave the ARCWEAR a speed of 12.12 knots when developing 1968 indicated horsepower at 72.5 revolutions per minute, a speed of 9.11 knots was attained when 972 indicated horsepower was developed at 55.8 revolutions per minute.

Briefly the principal dimensions of the ARCWEAR are: length between perpendiculars, 360 feet; maximum beam molded, 57 feet, 6 inches; depth molded, 26 feet, 9 inches; mean summer draft, 22 feet, 7½ inches; gross tonnage, 4157; net tonnage, 2503; deadweight on summer draft, 7080; and displacement, 9330. She is propelled by a single screw, driven by a triple expansion reciprocating steam engine with cylinders 21½ x 37 x 62 inches in diameter and a stroke of 42 inches. Steam at a working pressure of 220 pounds per square inch and a temperature of 630 degrees Fahr. is supplied by two single ended cylindrical boilers, 13 feet, 6 inches in diameter and 11 feet, 6 inches long.

The full load trials of this first arcform vessel were considered highly successful in every respect and confirmed the estimates, made by Sir Joseph Isherwood, based on tank experiments. It is likely that still further improvement will be possible with additional refinements including the possibility of developing a still more efficient propeller, though the one selected was chosen only after it won out over a number of other efficient designs tested.

Inland Tanker Code Up

A hearing was scheduled to be held in Washington Feb. 28 on the proposed code of fair competition for the inland water petroleum carrier trade in the eastern division of United States. Deputy administrator J. B. Weaver was to be in charge of the meeting.

The proposed code will prohibit shore employes from working more than 8 hours in a 24-hour period or more than six days in any seven-day period with exceptions for managerial, supervisory, or executive employes receiving more than $35 per week, and for ship keepers on vessels in laid-up or inoperative status. This would not apply to emergency work, but such work would be paid for at the rate of time and one-half for all time in excess of the daily maximum.

The present established hours of labor for vessel employes would be retained, pending a proposed adjusted schedule for these employes. A minimum wage of $15 per week is provided for shore employes except that office boys and girls may be paid not less than 80 per cent of this minimum. Employes on board vessels would receive a monthly minimum arranging from $57.50 for deck hands on non-propelled vessels, to $200 for masters of class A and class B, self-propelled vessels.

Frank W. Kennedy Dies

Frank W. Kennedy, vice president and general manager of the De Laval Steam Turbine Co., Trenton, N. J., died at his home at Yardley, Pa., Jan. 24. after a short illness. He was born at Pittsburgh in 1876, attended the Shadyside academy of that city, and graduated in civil engineering from Princeton university in 1898.

He served successively with the Pennsylvania railroad, the United States Steel Corp. and the Dravo Doyle Co., Pittsburgh.

Mr. Kennedy became general manager of the De Laval Steam Turbine Co. at Trenton, N. J., in 1908. In 1916 he was elected vice president. He was a director of that company and also president and director of the American Bauer-Wach Corp. with offices in New York. He was also vice president of the Wilbur Trust Co. and a director of the First Mechanics National Bank, Trenton, N. J. Mr. Kennedy was a member of the Society of Naval Architects and Marine Engineers.

S. S. Angelina Is Launched At Newport News Yard

The first of two ocean freighters building at Newport News Shipbuilding & Dry Dock Co., Newport News, Va., for the A. H. Bull & Co. Inc., New York, was christened the ANGELINA and launched at 11 a.m. Feb. 16. The sponsor was Miss Carolyn Bull, daughter of Ernest M. Bull, president of the owning company. Her father and mother accompanied the sponsor to the stand at the ceremony, which was attended by a large gathering. Following the launching the guests were invited to a luncheon at the James River Country club. The sistership, to be named MANUELA, will be launched in March.

Construction of these vessels has progressed rapidly. The keel for the ANGELINA was laid last September. It is expected now that she will be ready about the end of April to sail on her maiden voyage in the New York and Porto Rican trade and she will be followed in service by the MANUELA in the latter part of May. Accommodations are provided for twelve passengers.

With but few exceptions, these are the first strictly cargo vessels for ocean service that have been built in American shipyards since the post war boom. They were designed by the New York naval architects Gibbs & Cox, in collaboration with the shipyard. The general characteristics of the vessels are, length overall, 410 ft. 9″; length between perpendiculars, 390 feet; beam molded 55 feet; depth molded to upper deck, at side, 30 feet, 6 inches. The deadweight capacity is 7250 tons on a draft of 24 feet, 6¾ inches. The approximate gross tonnage is 4800, and the approximate net tonnage is 3000. The shaft horsepower is 3150 designed to give a service speed of 13 knots.

Propelling machinery is a single reduction geared steam turbine driving a single propeller. Steam is supplied by two Babcock & Wilcox marine type watertube boilers operating at a working pressure of 300 pounds per square inch. Customary superheat is also supplied. Both vessels are being built to the highest class in American Bureau of Shipping.

Capt. John H. Waltman, 74, veteran lake skipper, died in Chicago Feb. 16. Captain Waltman was born in Holland, Mich., and started his sailing career in 1874 as mate on the MARY, said to be the first trading schooner to dock in the Chicago harbor. He owned several schooners thereafter, including the WONDER and the MARY GREGORY. The latter was said to be the last of the trading schooners sailing the Great Lakes from a Chicago port.

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

A CONSIGNOR may recover overcharges exacted by a carrier, even though the consignee actually pays the freight, when under the contract of sale the amount so paid is credited on the purchase price of the goods, and the fact that the consignor accepted by an ocean carrier acted as agent of other who had reimbursed him for overcharges exacted by the carrier and relieved him of liability before suit was immaterial to the consignor's right to recover such overcharges.—Olliphant v. Florida East Coast Car Ferry Co., 4 Fed. Supp. 288.

* * *

IT IS undoubtedly the duty of a vessel to furnish stevedores a safe place in which to work and safe appliances to work with, and if that duty has been properly discharged the ship is not liable for injury to a stevedore due to negligence of employees of the stevedoring company. —NYHORN, 4 Fed. Supp. 403.

* * *

TO RECOVER contribution in general average, the vessel owner has the burden of establishing that he used due diligence, before the commencement of the voyage, to make the vessel seaworthy. The movement of the vessel from one berth to another in the same harbor is not the commencement of a voyage, so as to entitle the vessel owner to contribution in general average.—American-West African Line v. Socony Vacuum Corp., 4 Fed. Supp. 515.

* * *

LANGUAGE of clean bill of lading acknowledging receipt of fruit "in apparent good order and condition," creates only prima facie proof that the fruit, so far as visible, was not damaged. As against the original shipper, the carrier is not estopped from showing the true condition of the shipment when received on board. The recital is not a warranty and is not conclusive as between the immediate parties.—GEORGIAN, 4 Fed. Supp. 718.

* * *

THE duty to rescue a seaman overboard is a duty of the ship and of the owner under the general maritime law of the sea. This duty necessarily implies the duty to provide the means of rescue. Normally these means include an effective lifeboat, available life preservers, or life rings, so that the owner of oyster schooner, the only life-saving equipment of which was a defective lifeboat, improperly carried and without adequate oars, violated the merchant marine act by neglecting to provide proper means for rescuing seaman falling overboard.—G. W. GLENN, 4 Fed. Supp. 727.

* * *

IN THE case of AMERICA, 4 Fed. Supp. 774, a proceeding for forfeiture of a vessel for employment in an unlicensed trade, it was held that the decided listing of the vessel at her dock, and the fact that the vessel was unattended, afforded probable cause for search, nor was cutting through the floor of the vessel's engine room in the course of the search unreasonable, where nothing visible at the time of boarding and search of the engine room accounted for the listing. It was but natural, said the court, to suppose that a cargo of something more than the exposed fish and ice was the cause.

* * *

PERILS of the sea, within a provision limiting a shipowner's liability, means conditions which are so extraordinary or catastrophic as to overcome those safeguards by which skillful and diligent seamen ordinarily bring ship and cargo to port in safety, that is, conditions which could not have been foreseen in the exercise of reasonable prudence, or which could not have been guarded against by exertion of ordinary human skill and experience. Where a cargo is damaged by sea water entering through rivet or bolt holes in the deck, the fact that the vessel encountered heavy seas during the voyage is not alone sufficient to support a finding that the damage was due to perils of the sea, in the absence of proof that the rivets were in good condition at the commencement of the voyage—GEORGIAN, 4 Fed. Supp. 718.

* * *

SHIPOWNER cannot claim limitation of liability if he orders his ship to deviate, in this instance deviation meaning "a voluntary departure, without necessity or reasonable cause, from the regular and usual course." A bill of lading which does not permit liberty of deviation implies that the carrier will take the goods to destination by the usual and customary route; and so it need not expressly declare what the route is. Cargo owners, it was declared in PELOTAS, 66 F. (2d) 75, were not precluded from claiming deviation by reason of the fact that they had claimed possession of the coffee that was delivered at destination and had filed libels seeking recovery of damages sustained because of coffee lost or destroyed or damaged. They had the right to accept the goods or such part of them as could be delivered, and hold the ship and the owner of it who had ordered a deviation responsible for a breach of contract.

* * *

OWNERS of a scow negligently damaged in collision were entitled to restoration of the scow to as good condition as before the collision, irrespective of cost of actual repairs which did not so restore the scow, it was held in the case of AMES AND CARROLL No. 20, 66 F. (2d) 413. The lowest bid, after a survey on notice, to restore the scow was held the measure of the owner's damage, where saving by alternative method was not clearly shown. Where at the time the scow was under a seasonal charter at $14 a day, and the owners had no substitute, and season was closed before repairs could be made, the owners were entitled to demurrage at the charter rate for the stipulated duration of the charter.

* * *

THE fact that salvage services were rendered at the request of the insurer of a barge does not relieve the barge of liability. The barge is primarily liable unless the insurer was bound to indemnify the owners under the policy for liability incurred to the salvors.—G. L. 40, 66 F. (2d) 764.

* * *

ALTERATIONS made on a leaky vessel, partly for the purpose of pleasing a prospective customer, were held "repairs" within the Merchant Marine Act giving a maritime lien in the case of LUDDCO 41, 66 F. (2d) 997. A corporation to which the vessel was consigned for sale with authority to operate the vessel for demonstration purposes was presumably authorized to order repairs as "person to whom management of vessel at port of supply is intrusted," within the Merchant Marine Act.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	261	1,506,311	265	1,487,426
December	246	1,338,534	258	1,405,365
November	230	1,157,029	244	1,267,897
October	270	1,481,453	251	1,406,668
September	269	1,663,403	277	1,633,829
August	277	1,656,291	280	1,676,614
July	270	1,477,769	256	1,397,794
June	249	1,482,801	264	1,580,337
May	255	1,573,337	244	1,513,231
April, 1933	232	1,330,774	232	1,311,863

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	45	139,259	47	133,427
December	54	175,715	45	135,969
November	47	144,111	40	119,896
October	68	186,588	51	152,700
September	65	182,418	44	126,290
August	61	181,283	61	178,894
July	69	203,042	53	151,781
June	51	152,234	54	149,616
May	58	157,704	49	141,334
April, 1933	63	193,946	41	131,990

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	97	330,320	60	225,075
December	84	303,806	52	236,871
November	90	323,540	62	230,969
October	96	335,488	60	210,010
September	110	348,981	80	279,531
August	129	453,348	101	329,686
July	124	410,500	96	379,721
June	118	378,179	93	303,239
May	111	295,854	83	254,667
April, 1933	86	271,864	69	226,862

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	9	22,908	10	25,570
December	13	31,801	13	32,589
November	15	29,335	18	35,579
October	14	27,953	14	32,913
September	15	26,225	12	28,028
August	16	28,877	18	32,727
July	11	24,324	9	23,063
June	11	24,615	12	26,271
May	13	19,020	13	23,395
April, 1933	5	9,254	5	7,387

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	2	7,694	.....	.....
December	5	5,089	2	8,350
November	3	8,568	4	12,794
October	4	13,606	4	9,730
September	2	4,430	5	13,279
August	6	11,862	4	10,186
July	3	6,171	2	9,465
June	6	16,192	2	4,437
May	3	10,490	3	3,834
April, 1933	8	30,156	2	5,650

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	32	116,610	50	188,401
December	31	119,833	51	184,646
November	29	108,890	35	130,457
October	26	102,926	46	173,030
September	25	97,576	38	141,839
August	22	83,506	34	129,908
July	26	99,339	29	111,559
June	20	78,651	34	120,089
May	25	98,688	28	105,115
April	17	67,220	24	97,104
March, 1933	20	79,537	43	162,970

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	78	256,942	80	265,681
December	94	298,001	92	286,746
November	90	270,023	88	267,784
October	88	284,997	90	289,864
September	85	273,994	84	270,189
August	95	299,114	98	307,841
July	91	272,589	90	282,788
June	65	205,724	71	240,487
May	79	237,046	78	229,333
April	63	198,940	58	178,957
March, 1933	72	228,806	72	223,594

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	14	33,721	26	58,401
December	13	37,649	33	85,986
November	12	24,053	38	79,620
October	8	18,873	38	83,525
September	10	24,615	24	53,036
August	8	16,472	34	68,011
July	16	32,370	34	71,798
June	16	30,163	31	60,544
May	18	33,521	32	68,941
April, 1933	14	39,010	36	100,485

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	7	13,017	10	22,508
December	8	15,083	11	22,837
November	8	13,405	8	19,108
October	11	24,365	6	8,893
September	8	11,528	7	13,086
August	7	12,477	7	13,152
July	13	22,553	11	25,670
June	9	22,192	6	12,222
May	5	13,102	9	16,275
April, 1933	3	8,297	8	20,260

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	25	39,966	22	38,764
December	22	38,764	22	38,764
November	23	33,556	22	31,330
October	22	37,180	23	39,878
September	22	38,648	23	38,659
August	18	33,210	18	32,716
July	24	39,400	22	37,180
June	27	40,569	27	42,160
May	41	55,097	39	59,075
April, 1933	41	50,121	35	47,458

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	118	282,972	125	298,570
December	123	279,151	109	253,209
November	114	260,755	114	249,344
October	118	247,474	124	297,436
September	116	265,547	113	266,183
August	100	223,940	102	203,716
July	110	221,610	114	236,622
June	97	206,147	91	183,736
May	95	210,743	105	231,000
April, 1933	105	209,469	109	235,429

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	159	552,401	157	542,679
December	154	533,840	157	544,556
November	177	574,203	153	518,654
October	176	618,298	165	572,714
September	151	496,684	149	513,291
August	183	604,618	161	573,703
July	166	545,372	169	554,228
June	36	160,127	36	157,887
May	37	149,245	38	164,025
April, 1933	41	188,899	40	180,517

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1933	139	398,112	152	443,496
November	148	439,238	152	430,631
October	154	467,332	169	506,324
September	154	443,981	168	470,271
August	144	420,570	151	429,183
July	169	468,111	184	493,775
June	147	422,280	146	422,235
May	150	444,982	151	434,952
April	142	409,411	154	416,833
March	161	464,728	161	457,880
February, 1933	128	378,040	127	366,948

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	23	60,138	25	66,827
December	35	111,420	32	97,473
November	43	123,628	39	109,151
October	34	97,585	33	91,526
September	42	116,048	32	83,944
August	33	92,987	27	76,881
July	35	102,115	29	82,742
June	32	84,362	28	75,023
May	21	53,125	20	49,888
April, 1933	19	49,280	20	52,449

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	23	43,664	86	252,595
December	19	40,552	90	279,537
November	16	37,590	85	262,800
October	21	44,388	104	304,402
September	10	19,602	94	277,642
August	19	44,012	69	205,442
July	22	33,718	77	213,821
June	27	56,231	79	227,842
May	27	58,632	86	261,124
April	27	64,360	73	215,020
March, 1933	19	34,677	83	239,683

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
December, 1933	169	639,444	164	629,462
November	143	539,624	162	592,724
October	160	623,572	152	592,212
September	154	562,597	152	561,294
August	156	578,255	156	605,610
July	165	641,116	152	601,731
June	189	670,782	171	671,704
May	190	600,184	185	630,905
April	178	625,508	190	614,741
March, 1933	152	550,205	167	599,191

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	163	722,800	197	764,823
December	137	616,820	172	739,604
November	144	619,874	182	806,020
October	169	753,650	168	717,133
September	150	654,888	141	658,887
August	174	748,739	170	743,918
July	156	710,857	154	717,664
June	162	715,236	162	738,436
May	160	717,412	161	680,493
April, 1933	138	733,163	150	652,593

Houston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
January, 1934	23	88,164	37	128,773
December	18	65,566	31	109,206
November	14	49,486	30	106,943
October	28	105,818	41	151,872
September	20	70,827	27	89,893
August	22	91,240	31	117,641
July	33	122,722	40	153,173
June	28	96,996	34	118,058
May	32	127,718	43	164,896
April, 1933	20	80,016	29	103,049

Note: At the port of Philadelphia, additional vessels in the foreign trade in this category were 78 of 260,370 net tons entered and 81 of 274,285 net tons cleared for the month of January.

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

FURTHER information has been received on the tanker for the Gulf Refining Co., contract for which was placed with the Bethlehem Shipbuilding Corp. Ltd., for construction at the Sparrows Point works of its Baltimore plant. The tanker is to be fitted with twin screw diesel drive and the principal dimensions of the vessel are: 255 feet in length overall, 247 feet in length between perpendiculars, 40 feet molded breadth and 14 feet, 6 inches molded depth.

The main propelling engines are to be two six cylinder McIntosh & Seymour diesel engines of 425 brake horsepower each. For auxiliary purposes there are to be three Atlas Imperial diesel engines each of 75 horsepower direct connected to 50 kilowatt Diehl generators.

Engines for Harbor Cutters

The McIntosh & Seymour Corp., Auburn, N. Y., has received an order from the United States coast guard totaling $460,290 with an alternate figure of $417,575 for eight diesel main propelling engines for auxiliary generators.

The engines included in this contract for the main propelling generators are of six cylinders having 12½ inches bore and 13 inches stroke, each engine is rated at 530 brake horsepower. The four auxiliary engines are of two cylinders, 5½ inches bore, and 9 inches stroke, rated at 26 horsepower each.

Two of these main propelling generator units and one auxiliary generator unit, are to be installed in each of the four coast guard harbor cutters Nos. 61, 62, 63 and 64. Orders for building these vessels have been awarded to the navy department. One vessel is to be built at the navy yard, Portsmouth, N. H., and three are to be built at the navy yard, Charleston, S. C.

Diesel Engines Ordered

In recent weeks the Washington Iron Works, Seattle, has received contracts for diesel engines for several vessels, totaling 1200 horsepower. The largest installation is the two 200 horsepower engines for the mother ship BROWN BEAR for the Alaska Game commission of the department of agriculture. This vessel is to be 115 feet in length. One 100 horsepower diesel engine is to be installed in the 60-foot GRIZZLY BEAR, also for the Alaska Game commission. Although the engine contracts have been placed, bids have not yet been called for constructing the wood hulls of BROWN BEAR and GRIZZLY BEAR. Plans are also ready for additional boats for the Alaska Game commission.

Three wood hull, 30-foot scout patrol boats of shallow draft semi-tunnel type and high speed, designed by H. C. Hanson. Seattle naval architect, are to be built to operate with the two larger vessels for the Alaska Game commisison.

Additional diesel engines on order with the Washington Iron Works include one of 180 horsepower for the 72-foot cannery tender for the Annette Island Packing Co., Seattle, under construction at the yard of Mojean & Erickson, Tacoma, Wash.; one of 135 horsepower for a 74-foot tender for the Northwest Herring Co., Everett, Wash., under construction by the Western Boat Co., Tacoma.; one of 270 horsepower for the cannery tender MINNEHAHA of the Pacific American Fisheries Co., Bellingham Wash.; and one of 110 horsepower for the tender OVER-THE-TOP for the Premier Salmon Co., Seattle.

The state of Washington has allocated $110,000 for the construction of a powerful dredge, plans for which are now under way.

Activities in Northwest

Among other activities at the yard of Todd Dry Docks Inc., Seattle, the freighter KENTUCKY is undergoing extensive structural repairs. The same yard also recently reconditioned the steamer CACIQUE which had been sold to Japanese interests for breaking up.

The former navy tender RAPPAHANNOCK, recently sold to the Luckenbach Steamship Co., was towed from San Francisco to Seattle where bids are being taken for reconstruction at an estimated cost of $100,000. This vessel is to be fitted for intercoastal service and will have 100,000 cubic feet of refrigerator space.

Officials of the United States lighthouse service at Portland, Oreg., are awaiting authority from Washington in calling for bids for the construction of an 80-foot steel tender for service on the upper Columbia river. This vessel, to be named RHODODENDRON is to be equipped with two 120 horsepower diesel engines.

With a bid of $13,000 for each, the Tregoning Boat Co., Seattle was low bidder for the construction of five or more of the proposed eight 41-foot wood boarding launches for the United States Public health service. Bids were received from Pacific coast builders early in February. For the entire eight vessels the Seattle company submitted an offer of $104,000. These launches are to have a beam of 12 feet and are to be equipped with 50 horsepower diesel engines. They are designed for service at Pacific coast ports.

Tenders for three 71-foot wooden hull motor vessels for the United States Public health service were opened at Port Townsend, Wash., Feb. 10. These craft are to be propelled by 225 horsepower diesel engines and the hulls are to have a beam of 18 feet, 5 inches.

Place Order for Snagboat

The United States Engineer office, Vicksburg, Miss., has awarded a contract, for constructing and delivering two mooring barges to Jones & Laughlin Steel Corp., Pittsburgh, at a total cost of $51,216. Delivery is to be made within 110 calendar days after date of receipt of notice to proceed.

These mooring barges which are to be used for bank grader are to have a length of 150 feet, width 30 feet, and depth 7 feet.

The Vicksburg engineer office has also awarded a contract for the construction and delivery afloat at Vicksburg, Miss., of one self-propelled steam drive, channel and snag boat to the Nashville Bridge Co., Nashville, Tenn., at a total cost of $251,575. Delivery is to be made within 250 calendar days after date of receipt of notice to proceed.

This new channel and snag boat is to have a length molded of 170 feet; beam molded, 38 feet; and depth molded, 7 feet, 6 inches.

The district engineer of the United States engineer office Memphis, Tenn., will open bids March 8 for furnishing four sand and gravel pumps and spare parts. Three of these pumps are to be of 15-inch size and the fourth 12-inch size. The pumps are to be built in accordance with specifications issued by the district engineer. Spare parts will be in accordance to the schedule issued with requests for bids.

Ocean Cutter Awards Go To U. S. Navy Yards

On Jan. 26 the secretary of the treasury advised the navy department that its estimate for building seven coast guard ocean cruising cutters was satisfactory and the work might proceed.

The navy department's bid covered the construction of two of these cutters by the United States navy yard, New York, at an estimated cost of $1,607,200 for each cutter and for the construction of five of these cutters by the Philadelphia navy yard at an estimated cost of $1,636,000 for each cutter and $125,000 for acting as a co-ordinating agency for design.

It is assumed that the construction will be undertaken at the respective navy yard submitting bids but in the announcement made by the secretary of the treasury, it is not stated definitely where the new construction work will be assigned by the navy department. It is likely that one of the vessels will be built at navy yard Charleston, S. C., leaving four for the Philadelphia navy yard.

The new vessels are of steel construction and will have the following characteristics: length overall, 328 feet 6 inches; beam molded 41 feet, 3¾ inches; depth molded amidships, 23 feet, 6 inches; draft corresponding to normal displacement, 12 feet, 6 inches; and displacement, 2000 tons. Twin screw propulsion is called for by geared steam turbines of a total estimated shaft horsepower somewhat in excess of 7000.

United States Engineers

Plans and specifications were issued Feb. 8 for bids which are to be opened March 1 at the United States engineer office, Vicksburg, Miss., for the construction of one steel barge for bank grader. The barge is to have a length molded of 120 feet; width molded, 60 feet; and depth molded of 7 feet.

Bids were to be opened at the United States engineer office, Customhouse, San Francisco, on Feb. 28 for drydocking, cleaning, painting and repairing the United States seagoing hopper dredge CULEBRA. Extensive repairs are called for in the specifications including the installation of four new power operated and controlled watertight bulkhead doors for the construction of which bids were received on Feb. 2.

Bids were received at the United States engineer office, Kansas City, Mo., on Feb. 26 for furnishing six 40 feet, 6 inches long steel launches.

The same office on March 1 will open bids for furnishing 20 dredge pumps and spare parts for the Fort Peck dredges. Bids for furnishing spud frame sheaves and brackets for the same dredges were opened on Feb. 23.

Vinson Naval Bill

The house of representatives passed the Vinson naval construction bill which calls for the building of 102 vessels for the navy and 1000 additional fighting planes at an estimated total cost of $570,000,000. As this is written its passage by the senate with certain minor amendments appeared imminent. Its approval by the President seems to be a foregone conclusion. The proposed senate committee amendments gives the President discretionary power in dividing the work on this new construction evenly between private shipyards and navy yards. The senate committee removes the requirements that alternate vessels must be built in navy yards and private yards respectively, so long as not less than one-half of the tonnage is built in naval establishments. Another senate amendment also strengthens the clause in the house bill, limiting the net profit on government naval contracts by specifically stating that it must not be more than 10 per cent of the gross amount of the contract.

Immediately on the passage of this bill and its signature by the President, it is understood that funds will be requested for laying down 20 of the vessels called for in this program. The amount immediately needed would be between $15,000,000 and $25,000,000 to cover the expenditures necessary for the first year's work on the new vessel.

New Vessel Is Planned for South African Line

Under the terms of its mail contract the American South African line must build an additional vessel of class 5 which calls for a speed of at least 13 knots and a gross tonnage of not less than 8000. Two vessels were called for in the contract. The first of these two, a twin screw diesel propelled combination cargo and passenger vessel, the CITY OF NEW YORK, was completed on Jan. 17, 1930 and has been in regular service since this time. It is understood that plans and specifications are now being prepared by the New York naval architects, Gibbs & Cox for a second liner for the New York-South African trade, which is now firmly established.

The new vessel will also be a combination cargo and passenger liner, and will have the same general characteristics as the CITY OF NEW YORK though there are likely to be some important changes and innovations. General characteristics of the CITY OF NEW YORK are as follows: Length overall, 470 feet 9 inches, length between perpendiculars, 450 feet; breadth molded, 61 feet, 6 inches; depth molded, 37 feet; draft loaded, 26 feet; displacement loaded, 15,000 tons; gross tonnage, 8272; net tonnage, 5025; passenger capacity, first class, 61, cargo capacity in cubic feet, 449,055 bales; bunker fuel capacity, 2200; and speed, 14 knots. Propulsion is by means of twin screws, each direct connected to a 2700 horsepower at 100 revolutions per minute, four cylinder, Sun-Doxford opposed piston diesel engine. Both the machinery and the vessel were built by the Sun Shipbuilding & Dry Dock Co.

In the companion vessel, now being planned, steam as well as diesel drive is receiving consideration. It is likely that the new vessel will be stepped up somewhat in speed over that of the CITY OF NEW YORK.

It is expected that plans and specifications for the new vessel will be submitted to the shipyards around April 1. A minimum of delay is antfcipated in receiving bids and in awarding the contract.

Bunker Prices

At New York

	Coal F. o. b. per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Feb. 19, 1934	5.35@5.20	1.25	4.79
Jan 18,	5.35@5.20	1.25	4.79
Dec. 18.	5.35@5.20	1.25	4.79
Nov. 18.	5.35@5.20	1.15	4.70½
Oct. 18.	5.00@5.75	1.15	4.70½
Sept. 18.	4.45@4.75	1.15	4.70
Aug. 18.	4.45@4.75	.90	4.32
July 18	4.30@4.60	.90	4.32
June 18..	4.30@4.60	.80	4.08
May 18.	4.30@4.60	.80	4.08
Apr. 18, 1933	4.30@4.60	.80	4.08

At Philadelphia

	Coal trim in bunk per ton	Fuel oil alongside per barrel	Diese engine oil alongside per gallon
Feb. 19, 1934	4.65@4.50	1.25	4.76
Jan. 18,	4.65@4.50	1.25	4.76
Dec. 18,	4.65@4.50	1.15	4.76
Nov. 18.	4.65@4.50	1.15	4.76
Oct. 18.	5.00@5.75	1.15	4.76
Sept. 18.	4.45@4.75	1.15	4.88
Aug. 18.	4.45@4.75	.90	4.28
July 18	4.30@4.60	.90	4.28½
June 18.	4.30@4.60	.80	4.04
May 18.	4.30@4.60	.80	4.04
Apr. 18, 1933	4.30@4.60	.80	4.04

Other Ports

Feb. 19, 1934

Boston, coal, per ton.	$ 7.21
Boston, oil, f. a. s. per barrel	$1.10½
Hampton Roads, coal, per ton, f.o.b. piers	$4.50–4.80
Cardiff, coal, per ton	14s 0d
London, coal, per ton	—s –d
Antwerp, coal, per ton	17s 0d
Antwerp, Fuel oil, per ton	67s 6d
Antwerp, Diesel oil, per ton	82s 6d
British ports, Fuel oil	87s 6d
British ports, Diesel oil.	102s 6d

Note: Figures given for coal at New York and Philadelphia are for Classes A and B according to the Code; Class C is slightly less.

Trunk Piston Diesel Engine of Large Bore, Stroke

The Busch-Sulzer Bros. Diesel Engine Co., St. Louis, has designed and constructed a three cylinder experimental trunk piston diesel engine with cylinders 30 inches in diameter and 52 inches stroke. This large trunk piston engine is now in operation on its test bed at the plant of the builder. The engine was designed and constructed to explore thoroughly all problems presented by the largest size of trunk piston, in order to establish all appropriate intermediate bores and strokes.

This company has built five large trunk piston engines with cylinders 19½ inches in diameter and 27 inches stroke. Three of these engines are rated 3000 horsepower in 10-cylinders at 240 revolutions per minute.

Between this size and the 30-inch diameter by 52-inch stroke at 120 revolutions per minute of the experimental engine are numberless variations of cylinder diameter and stroke to meet particular requirements of head room, weight, higher speed gear drives, and electric drives, ranging from a bore to stroke ratio of 1.5 down to square cylinders. The latter of course have slightly higher fuel consumption but offer lowest head room where this is essential for navy and passenger ships.

In other words, with the same design of simple trunk piston engines, the entire field from 1000 to 10,000 horsepower and from 90 to 500 revolutions may be covered by merely changing the bore and stroke. The object is to develop an engine with the fewest number of parts, lowest manufacturing cost, minimum upkeep and maximum simplicity and reliability.

A. G. Pratt, president of the Babcock & Wilcox Co. has been elected a member of the board of directors of the Worthington Pump & Machinery Corp.

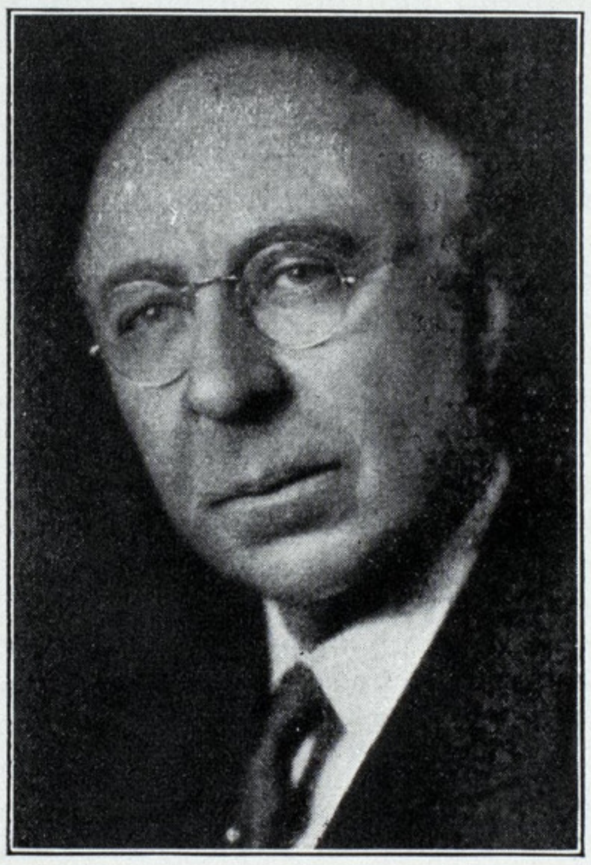
A New Spherical Compass

A magnetic compass of new form has been invented and perfected by Wilfrid O. White, Boston. It is known as the Kelvin-White spherical compass.

Since the magnetic compass was first made the marine compass bowl has always had a flat top glass until four years ago, when Mr. White, in conducting experiments to produce a steady compass, became convinced that if the compass bowl were spherical it would result in greater steadiness of the card at sea. The motion of a ship whether rolling or pitching or a combination of both is in a vertical direction. Consequently in a flat top compass the liquid, disturbed in a vertical direction, hits the glass and then swirls around the bowl in a horizontal direction. The card is thus naturally agitated causing the unsteadiness common to the old type of compass.

In the spherical bowl, however, the liquid, in the form of a ball with the card in the center of it, remains still even though the bowl is disturbed in any direction, and, therefore, no horizontal swirl is possible. As a result the card is very steady. Also in this new spherical compass the magnetic element has been redesigned so that the inertia and the magnetic moment are in harmonious arrangement to one another.

The combination of the spherical glass bowl and the liquid that fills it completely, forms a meniscus lens which tends to magnify the card at the far side, away from the observer, where it is most needed. Steadiness



Wilfrid O. White

and greater visibility are but two of many improvements in the new spherical compass. The safety factor is of great importance to the navigator and the owner.

The binnacle head of the usual steering compass makes it impossible for the watch officer to see the compass without making a special effort by going around to the side of the helmsman. The spherical compass is open and visible from all parts of the pilot house.

The Kelvin-White spherical compass has been tested on shipping board vessels and privately owned passenger vessels on trips to South America, Europe, and in other world routes with entire success. Remarkable steadiness and reliability have been demonstrated. The United States coast guard and lighthouse departments have specified this compass for their new vessels. The American Hawaiian Steamship Co. has ordered this type of compass installed on 25 of its ships after seagoing trials covering a month.

Intercoastal Trade Inquiry Under Way in New York

With a view to obtaining necessary information regarding conditions in the intercoastal trade, the secretary of commerce has approved a thorough inquiry of the prevailing policies, practices, services and charges of ocean carriers operating between Atlantic and Gulf ports and the Pacific coast via the Panama canal.

As this is written formal hearings, open to the public, were scheduled to begin in New York, Feb. 26. At a later date, not yet announced, another hearing will be held in San Francisco. Sixty-two carriers have been named as respondents and have been notified to appear, either in person or through representatives.

H. H. Heimann, director of the department's shipping board bureau, announced that the hearings will be conducted by the bureau's division of regulation. He also stated that the purpose of the inquiry is to establish a basis of facts regarding actual conditions in the intercoastal trade with a view to promoting greater stability in the trade.

Among the matters to be inquired into as specified by the secretary are, the pooling of revenue by conference lines, rate differentials between different lines, port equalization, the performance of transportation service or services in connection therewith without proper tariff authority, the non-performance of services which carriers by their tariffs hold themselves out to perform, private contracts between carriers and shippers, competition between members of the Gulf intercoastal conference and members of the United States intercoastal conference and the holding out by carriers to perform services which are actually performed by other persons.

The hearings will be held solely for the purpose of obtaining, in the most direct manner, certain definite information needed by the department for the proper administration of the intercoastal shipping act of 1933.

Upon conclusion of the hearings, a report containing the tentative findings and conclusions will be served upon the respondent carriers and all others who testify. Opportunity will then be given for the filing of exceptions.

The directors of Todd Shipyards Corp. at their monthly meeting, held Feb. 20, declared a quarterly dividend of 25 cents per share, payable on March 20 to stockholders of record at close of business March 5.

Equipment Used Afloat and Ashore

Fumigation—Lubricant—Valves—Turbo Blowers—Lighting Sets —Cranes—Condenser Tube Fastening—Pipe Cutting Machine

A NEW chemical substance, known as malium, which kills insects and pests, but which in ordinary concentration is entirely harmless to human beings, has been perfected by the Michigan Alkali Co., New York City, the largest manufacturer of dry ice in the world, and one of the leading chemical manufacturing companies in this country. Among other uses the substance is expected to find wide application in the fumigation of grain elevators and ships. Being non-toxic to human beings it can be used safely for fumigation under any conditions. It is used without heating or the addition of other chemicals.

Malium is a colorless, volatile liquid with scarcely any odor. It is made from a combination of carbon dioxide with newly developed synthetic chemicals and is the result of four years of research. An important feature for ship fumigation is that besides being colorless, tasteless and odorless to human beings, it leaves no residual odor or taste in food stuffs. It would be particularly applicable for keeping cargoes of food, fruits, nuts and candy free from worms.

New Thread Lubricant

A NEW metallic lead thread lubricant has recently been developed by the Armite Laboratories, 1900 East Sixty-fifth street, Los Angeles. This new lubricant is said to be of unusual effectiveness in the assembling of machinery and in the repair of equipment subjected to heavy duty and high temperatures.

It is a very finely divided metallic lead in paste form. In use a film of metallic lead is formed between the threads which prevents galling, speeds up repair work and reduces cost. With its use stud bolts will not freeze nor will pipe threads corrode together, regardless of time, as the lead does not oxidize or harden.

Use of this lubricant on liners and flywheels is said to facilitate their insertion or removal. Even a bright red heat does not harden or destroy the compound in the threads, making it an ideal dope for exhaust studs.

Portable Lighting Sets

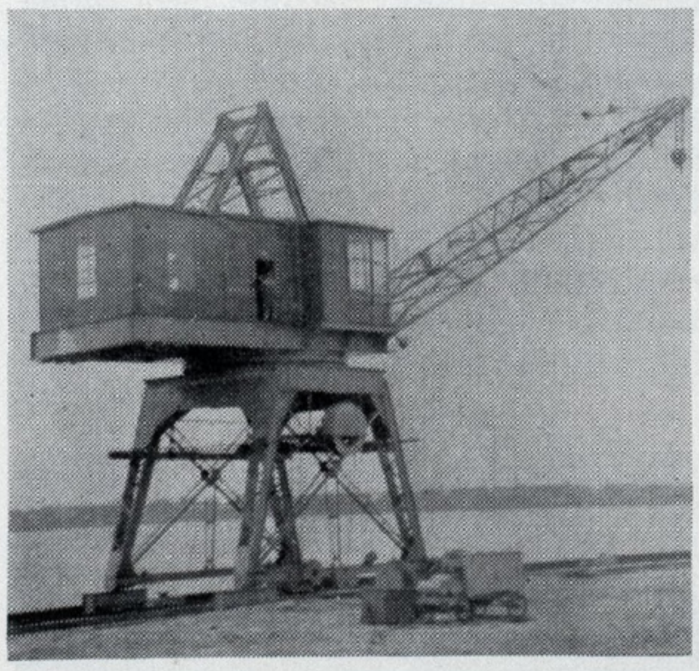
THE HARNISCHFEGER SALES CORP., Milwaukee, Wis., has recently perfected a line of portable lighting plants. The small, heavy duty lighting unit consists of a one or two cylinder gasoline engine directly coupled to a compound wound, continuous generator. Either push-button or manual starting is available. Capacities range from 400 watts to 3 kilowatts generating 35 or 120 volts direct current. Greater capacities are provided for by four and six cylinder gasoline generator sets with a current range of 1½ to 60 kilowatts.

In addition to these gasoline driven sets, diesel power is also available. These modern diesel generator sets are built in capacities of 35 and 50 kilowatts, alternating or direct current.

Advantages claimed for these new generating sets are high reserve capacity, economical operation, simplified design and continuous, non-flickering current.

Electric Welded Crane

A LARGE gantry crane, said to be the first of its type to be built entirely by welding, has been completed by the Shaw-Box Crane & Hoist Co., Inc., Muskegon, Mich. The crane weighs approximately 150 tons and has a boom 96 feet in length. The boom carries a 55-inch lifting magnet or a clam shell dipper. The crane operates on four swivel trucks which permits operation on curved as well as straight tracks. Rails are spaced 20 feet from center line to center line. The boom is of latticed type, all welded, when it is in a vertical position the height of the lift is 123 feet.



Electric welded gantry crane

A few bolts were used for erection purposes but the complete structure is essentially of arc welded steel construction. Welding was decided upon because of simplicity, rapidity of construction and saving in weight.

All welding was done by the shielded arc process using equipment supplied by the Lincoln Electric Co., Cleveland.

The crane is now in operation at the West Michigan Dock & Market Corp., Muskegon, Mich.

Standard Bronze Valves

THE Kennedy Valve Mfg. Co., Elmira, N. Y., has developed a new line of heavy standard bronze globe and angle valves. These valves represent a number of improvements in design which have been adopted after extensive factory and service tests.

As a protection against rusting and with the additional advantage of making the threads self lubricating, the malleable iron union bonnet ring and stuffing box nut have been plated in cadmium. This plating will not chip or wear off and gives an attractive appearance to the valve.

A feature of the new valve which reduces operating effort is the special design of the bearing surface between the stem and the disc holder. The stem head has a rounded machined bottom surface which makes a low friction bearing contact with a smooth milled recess in the disc holder. This not only reduces friction to a minimum, but also makes it easier to start the valve open and to close the valve to an absolutely tight position.

The new valves are made in a full range of sizes from ¼-inch to 3 inches inclusive and are suitable for 150 pounds working steam pressure and 250 pounds working water pressure.

Turbo-Blower Business

Ingersoll Rand Co. has acquired the turbo-blower business of General Electric Co. and will consolidate it with its own turbo-blower department. With this addition Ingersoll Rand will be in a position to supply blowers and centrifugal type compressors for a broad variety of uses. The company has long been established in the manufacture of blowers of medium and large capacity for pressures ranging up to 100 pounds, while General Electric specialized in both single and multi-stage units for low and medium pressures.

Ingersoll Rand also secures an exclusive right under the various General Electric patents. Sales activities will be directed from Ingersoll Rand Co.'s general offices at 11 Broadway, New York.

250-Ton Revolving Crane In U. S. Navy Yard

IN JANUARY, 1933 the installation of the largest revolving crane in the world of the roller circle turntable type was completed at the Puget Sound navy yard, Bremerton, Wash. This crane has a capacity of 250 long tons, and it was designed, built and erected by The Dravo Contracting Co., Pittsburgh.

The crane consists of a fixed tower structure of octagonal cross section carried on a square trussed portal. At the top of the tower structure, which is approximately 125 feet high, a deep box girder system carries the rolled steel track on which rests the live roller circle consisting of forged steel tapered rollers forming a turntable about 60 feet in diameter.

The rotor consists of the boom with its length of front cantilever of 190 feet carrying the trolleys and its rear cantilever of 120 feet carrying the house for the operating machinery and concrete counterweight, all carried on two semi-circular welded box girders supported on rollers.

The main load of 250 long tons is carried on a balance beam supported from two trolleys of 125 long tons capacity each with a maximum working radius of 115 feet; while an auxiliary trolley of 30 long tons capacity runs out to an extreme working position of 180 feet radius.

A welded balance beam supporting the 250-long ton load is carried from two 125-long ton hooks by means of heavy forged steel shackles. Each 125-ton hook is supported from its respective trolley by 12 parts of 1½ inch wire rope, which is in a single piece with the loop around an equalizing sheave toward the front of the boom and with its ends made fast to the hoisting drum. The main trolleys are of welded construction and are carried on eight fully equalized rolled steel wheels.

Official acceptance tests by the United States navy were based on the specification that all operations be performed as would be required in the contemplated service of the crane and with maximum test loads specified at 125 per cent of the normal rated load.

With a test load of 700,000 pounds at a radius of 115 feet the deflection at this point was 3¼ inches. The trusses when reamed in a horizontal position at the time of shop pre-assembly were given an upward camber of 6 5/16 inches at the extreme end of cantilever with calculations showing that the remaining camber under a dead load would be 5.022 inches. A check after completion of erection showed a remaining upward camber at the extreme end of exactly 5 inches.

The tower structure under no load, leaned backwards 1/6 of an inch, and with a full load of 250 long tons at 115 feet radius, the leaning of the tower was forward and amounted to 1/3 of an inch. With the maximum load on a single main trolley, approximately 350,000 pounds at 115 feet radius, the difference in the elevation of the two trusses caused by this eccentric loading was ¼ of an inch.

This crane has now been in full operation for over a year and has in every way fulfilled its purpose.

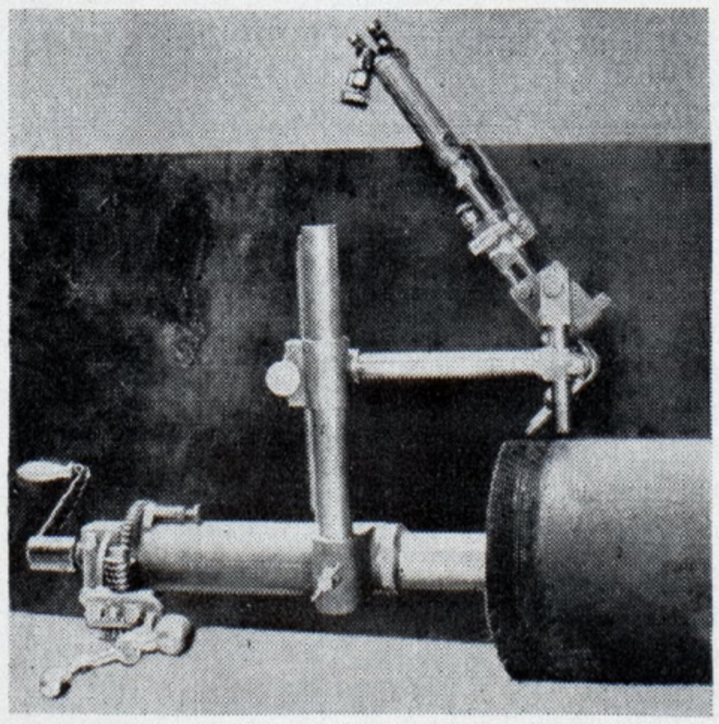
Companies whose equipment contributed to the success of the crane are: Electric Controller & Mfg. Co., Cleveland, control apparatus; Otis Elevator Co., New York, elevator; Shaw-Box Crane & Hoist Co. Inc., Muskegon, Mich., machinery house crane; Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., monorail cranes; and Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., motors and brakes.

Pipe Cutting Machine

ANOTHER new cutting machine has been developed for pipe cutting and beveling by the Linde Air Products Co., 30 East Forty-second street, New York. The new machine in position for cutting a pipe is shown in the accompanying illustration.

It consists of a center rod with three spreading arms which press against the inner wall of the pipe, holding it in position, with an arm supporting a blow pipe that can be adjusted to the desired angle of the cut. The blow pipe and arm rotate without the use of a crank for quick centering of the device, and by means of a crank when doing the actual cutting.

This machine is designed to take almost any hand cutting blow pipe, is readily portable, and its operation is extremely simple. Once centered in the pipe the operator merely turns the crank causing the blow pipe to rotate evenly around the pipe, making a clean machine-like cut. Wherever large quantities of pipe are to be cut and beveled, this machine will save time, money and trouble.



Pipe cutting and beveling machine

Condenser Tube Fastening New Methods Offered

TWO unique methods of tube fastenings at the inlet end of tubes in surface condensers, coolers and heaters have been developed by the Crane Packing Co., 1800 Cuyler avenue, Chicago. These methods have none of the disadvantages of rolling and have the advantage of firmly fixing the tube, allowing expansion to take place entirely in the direction of the outlet tube sheet.

In the first method a gasket is inserted into the bottom of the drilling and then a soft admiralty metal cone is slipped over the tube against the gasket. Next a hard admiralty metal seat is slipped into the cone. A streamline ferrule designed to come flush with the tube sheet is screwed against the seat. An alternate method consists of a gasket, cone, and a special ferrule so beveled that it replaces the seat and the ferrule described above.

The ferrule applies a pressure against the seat, compressing the soft cone radially against the diameter of the tube and thus gives a perfect mechanical seal without even measurable deformation of an 18-gage tube. By using this method in combination with the metallic condenser packing, supplied by the same company, for the outlet end, it is possible for the operator to remove tubes from the condenser simply by removing the ferrule, drifting the tube through the outlet packing and removing the tube from the inlet end. The fitting parts are interchangeable and may be re-used and, by careful drifting of the tube through the packing at the outlet end, it is possible to slide the tube back and caulk the packing home so that the unit can again be put on the line without leakage.

Where erosion, aeration, or tube metal thinning at the inlet end is experienced it is possible with this fitting to remove the tube from the condenser, turn it end for end and thereby make possible twice the life of the tube which was originally rolled at one end.

This method provides a perfect metal to metal joint at the inlet tube sheet and the tubes are fixed at one end, allowing all the expansion to take place toward the outlet tube sheet. Tubes are removable for inspection and may be replaced through the outlet packing.

By use of this method many thousands of dollars of tubes in present installations which would otherwise have to be thrown away can be saved. This saving is possible because the cost is but a small proportion of that of new tubes. Furthermore, the operation may be continued without leakage as long as the average tube wall thickness is

(*Continued on Page* 40)

Heat Transfer Is Studied Pipes, Stream of Air

An interesting paper, on heat transfer between metal pipes and a stream of air, prepared by E. Griffiths and J A. Awbery of the National Physical laboratory, was presented Dec. 15, 1933 before the Institution of Mechanical Engineers in England.

This paper describes measurements on the heat transfer from iron and copper pipes of diameters ranging from 1¼ to 3 inches at various temperatures up to 90 degrees Centigrade and air moving with velocities up to 30 feet per second, when the axis of the pipe is placed transverse to the stream of air.

An iron pipe of external diameter 1 29/32 inches was also tested placed longitudinally along the direction of the air stream and subdivided into sections, the heat loss from various sections being measured. This loss is greatest at the section where the air first meets the pipe and gradually falls off along the pipe. If the air is artificially made turbulent, the loss from all the sections shows an increase, the greatest change being shown by the first section. The heat loss from a longitudinal pipe is of the order of one-half that from the transverse pipe.

Tested in Banks

A number of similar iron pipes of the same diameter were studied arranged in banks in square formation. In this case the second layer of pipes met by the air loses more heat than the first layer, the third layer losing the same as the second. It is suggested that this is due to the eddy motion set up in the air when it passes the first layer, no further increase in the eddy motion occurring afterwards.

In a diagonal formation with rows 2¼ inches apart, the first section again loses least heat. In this case not only is the loss in the second row greater than that in the first, but there is a further increase in passing from the second to the third row, after which the coefficient is constant.

When air impinging on a bank in staggered formation is artificially made turbulent, the heat loss from every row is increased to such an extent that the first row loses more heat under these conditions than the third row when there is no artificial turbulence.

In addition the investigation was carried out with pipes below zero degrees Centigrade. If there is no ice or snow deposit on the pipe the relation is the same as for hot pipe. Pipes below zero degrees Centigrades may become covered with a deposit of ice or snow, and in this case the interpretation of the results is less straightforward. If the formulae refer to the actual pipe diameter and temperature difference between the pipe and the air, then the smooth curve through the observations is again identical, within experimental error, with that for hot pipes. This can only be a coincidence, the insulating value of the deposit being compensated by the greater area presented to the wind, since the effective pipe diameter has become larger, and has a higher surface temperature than that of the metal

From the result for dry pipes it would be expected that if reference is made to the overall diameter and the temperature difference, that between the air and the outer surface of the deposit, this new result would coincide with that of hot pipes. The experimental results show that this is so if the outer surface of the deposit is dry, but that if the conditions are such that water is dripping off, the heat transfer may be 30 per cent greater than the normal amount.

Polish Vessel Launched

Swan, Hunter & Wigham Richardson, Ltd., England, on Jan. 15 launched at its Neptune yard a single screw steamer building to the order of the Polish British Steamship Co. Ltd., Gdynia, Poland, for service between Gdynia and Hull.

The principal dimensions of the new vessel are length about 292 feet; breadth, 40 feet, Hull and machinery, are being built to the special survey of Lloyds Register. The hull is being strengthened forward for navigation in ice. The deadweight on a mean draft of about 16 feet, 9 inches will be 2000 tons. Accommodations are to be installed for 12 passengers in two single berth rooms and five double berth quarters.

The vessel has been designed and will be equipped for the carriage of bacon, butter and eggs and is to be fitted with a steam driven refrigerated machine of the most modern type. There are three spacious cargo holds. No. 2 hold and 'tween decks aft are being insulated for carrying refrigerated cargo. The remaining space is to be utilized for general cargo. In addition there are insulated cold chambers in the 'tween decks for provisions.

Propelling machinery, which is also being supplied and installed by the shipbuilder, will be of modern design and will consist of a single screw driven by a triple expansion-engine operated in conjunction with a low pressure exhaust turbine on the Bauer-Wach system. Steam is to be supplied by two boilers 14 feet, 3 inches in diameter by 11 feet, 6 inches long, designed for a working pressure of 220 pounds per square inch.

This new vessel has been named the LECH.

A. L. Weil has been elected president of the General Petroleum Corp. of California to succeed J. A. Brown resigned.

Passengers Carried on Two U. S. Liners

The liners MANHATTAN and WASHINGTON of the United States Lines have carried in all up to Feb. 19 (not including the then current voyage of the WASHINGTON) a total of 41,293 passengers. Everything considered, this is an excellent record.

The MANHATTAN entered service Aug. 11, 1932 and since that time, up to Feb. 19, 1934, she has made 20 transatlantic round trip voyages. On these 20 voyages she carried 11,676 passengers eastbound and 13,206 passengers westbound, making a total of 24,882 passengers in transatlantic crossings. In the meantime the MANHATTAN has made three cruises to Bermuda carrying a total of 1851 passengers. She has also made one cruise to sea on which she carried 476 passengers. The total passenger carrying since she entered service and up to Feb. 19 total 27,309.

The sistership, WASHINGTON, sailed transatlantic on her maiden voyage May 10, 1933. Since that time (not including the voyage current Feb. 19), she has made ten round trip Atlantic crossings. On these ten voyages she carried 6054 passengers eastbound and 6806 passengers westbound for a grand total of 12,860. On July 1, 1933 the WASHINGTON on a cruise to sea carried 887 passengers. On a cruise to Bar Harbor Aug. 26, 1933 she carried 337 passengers. This makes a total of 14,084 passengers carried by the WASHINGTON since she entered service last May, not including the voyage current Feb. 19.

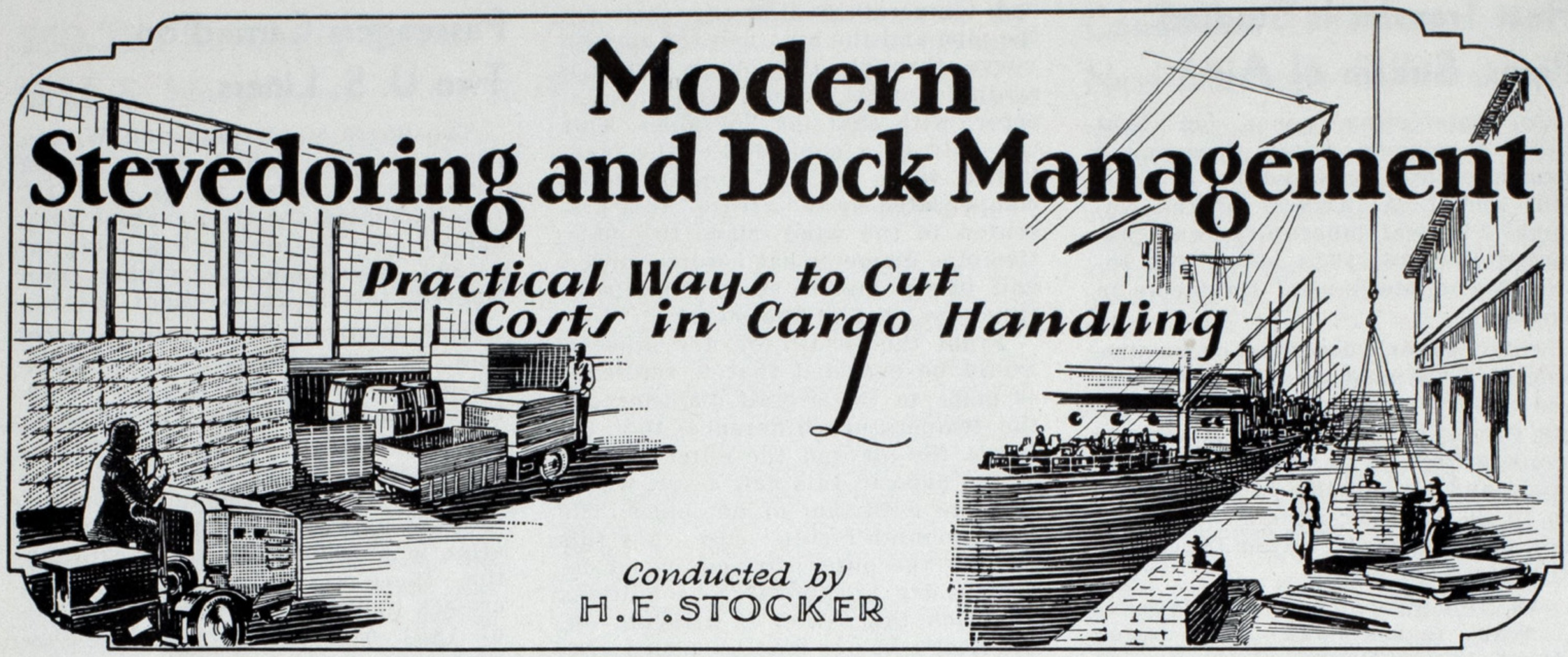
In addition to this good showing in carrying passengers, both the MANHATTAN and the WASHINGTON, it is understood, have carried considerable high class freight though no figures are available.

Propeller Club Dinner

The Propeller club of the port of New York held a dinner-dance on board the S. S. SANTA ROSA at Pier 95 North river, on the evening of Feb. 15. A large gathering assembled on this fine new American vessel which has established high standards of speed and luxury between New York and the Pacific coast via the Spanish Americas and the Panama canal.

An opportunity was given guests for a thorough inspection of the new liner. R. R. Piper was chairman of the committee making the arrangements.

The superintendent of lighthouses at Chelsea, Mass., has awarded to I. L. Snow Rockland, Me., a contract for conversion of the lighthouse tender ANEMONE to oil burning, on a bid of $33,475 tendered Jan. 8.



A Quick Turn Around by Ward Liner Morro Castle at New York

By Albert Banscher

THE MORRO CASTLE of the Ward line arrived in New York on the morning of Sunday, Jan. 28, and sailed the same evening after having discharged 2000 tons of cargo and loaded 1700 tons. The loading and unloading time is believed to be a record for that quantity of cargo on an East river pier. Due to union regulations, longshoremen did not begin until 10 a. m. and the ship was loaded by 9 p. m., an elapsed time of ten working hours, one hour being taken off for supper. Cargo discharged totaled 60,428 pieces and included 25,735 bags of sugar, 29,882 crates of vegetables and 2792 cases of Bacardi rum. Besides the 1700 tons of cargo and the usual stores and supplies, 636 tons of fuel oil and 700 tons of water were taken on board.

Care in Design and Operation

The Ward line maintains weekly sailings between New York and Havana. This quick turn-around is made possible by the superior speed of the fine ships, MORRO CASTLE and ORIENTE, together with the proper organization and management of its cargo handling method. Arrivals and sailings, at the present time are on Sundays due to the north-bound movement of vegetables. During the remainder of the year, however, arrivals and sailings are on Saturdays.

It is the opinion of many that the MORRO CASTLE, which with her sistership was designed by Theodore Ferris, is an outstanding example of a carefully planned and efficiently operated ship. From the standpoint of cargo handling and stowage, the design of the ship and the material handling methods in actual operation embody the principles and methods discussed in this section for the past five years.

The ship has nine side ports for cargo in addition to four side ports for handling passengers and stores. The type and number of cargo ports, location and size, as well as passenger ports and ports for handling stores, are as follows:

Type	Location deck	No.	Clear opening
Cargo	Main	2	8′ 0″ x 6′ 9″
Cargo	Upper	7	8′ 0″ x 7′ 6″
Passenger	Bridge	1	8′ 6″ x 7′ 0″
Passenger	Shelter	1	7′ 0″ x 7′ 0″
Stores	Upper	2	4′ 0″ x 6′ 0″

The doors for the double ports are in two pieces split vertically on the centerline and arranged to swing outboard, one forward and one aft. The doors that are in three pieces are split horizontally on the centerline and have the lower half split vertically on the centerline arranged to swing outward, forward and aft. The upper part of the door is arranged to swing up. The quadruple doors are split horizontally and vertically on the centerline with all sections opening outboard, two forward, two aft.

Has a Total of Seven Hatches

The MORRO CASTLE has a total of seven hatches. Two of them are weather deck hatches, the remaining being blind hatches. The size and location of the various hatches are as follows:

No.	Size	Location
1	15′ 9″ x 12′ 0″	Forecastle, trunked to shelter, Upper
1	15′ 9″ x 10′ 0″	Main, Lower
2	20′ 9″ x 16′ 0″	Forecastle, trunked to shelter
2	23′ 6″ x 16′ 0″	Upper, Main
2	23′ 6″ x 14′ 0″	Lower
	′ ″	Upper, Main, Lower
4	11′ 0″ x 18′ 0″	Upper, Main
4	11′ 0″ x 13′ 6″	Lower
5	11′ 0″ x 18′ 0″	Upper, Main
5	11′ 0″ x 13′ 6″	Lower
6	11′ 0″ x 18′ 0″	Upper, Main
6	11′ 0″ x 13′ 6″	Lower
7	11′ 0″ x 18′ 0″	Upper, Main
7	10′ 6″ x 11′ 0″	Lower

There are six booms for the two weather deck hatches. There is one 5-ton steel boom at No. 1 hatch, which is 35 feet long, and two booms of the same capacity and construction which are 52 feet in length. At No. 2 hatch there are two 5-ton steel booms, 52 feet long, and a heavy lift boom rated at 25 tons which is 56 feet long. The blind hatches are served by two cargo arm cranes at each hatch.

Steel Hatch Covers

The hatch covers of No. 1 hatch weather deck are of steel construction, built in one piece and hinged up forward. The No. 2 weather deck hatch cover is also of steel, but is divided in two places with forward third hinged up and aft on the after two-thirds, which is hinged up and aft.

Both hatches are fitted with small trap hatches 24 x 24 inches.

All 'tween deck hatches are fitted with a steel plate brow with spruce filler welded in place all around the hatch except in the way of the winches. This facilitates handling freight from the hatch to the wings and fore and aft parts of the deck.

The number of electric winches provided together with types, that is whether single or double drum, and location, are shown in the table below:

No.	Type	Location and Deck
2	Single	Aft. No. 1 hatch.....Fostle.
2	Double	Ford. No. 2 hatch.....Fostle.
2	Single	Aft. No. 3 hatch.....Upper
2	Single	Ford. No. 4 hatch.....Upper
2	Single	Aft. No. 5 hatch.....Upper
2	Single	Ford. No. 6 hatch.....Upper
2	Single	Aft. No. 7 hatch.....Upper

On Jan. 28, 3700 tons of cargo were handled in ten hours a total of 370 tons per ship hour. Eighteen men were used in a gang, both for loading and discharging. Sixteen gangs were used for working the ship and two gangs were used for sorting perishables. This gives an average of 20.5 tons per gang hour.

One gang discharged hides from No. 1 hatch to a lighter. At the same time, sheet metal was being loaded into No. 2 hatch. The author has seen two gangs discharging sugar from No. 2 hatch, using three ships' booms, and a boom on a lighter which handled slingloads from the deck to the lighter.

In addition to No. 1 and 2 hatches, eight side ports are used. Side ports not only provide a greater number of cargo openings, but facilitate the use of conveyors and other mechanical equipment. Side ports on the MORRO CASTLE permit two movements through the port at the same time. Two gangs, one for loading and one for discharging are used in six of the upper deck ports.

Belt conveyors are used in discharging perishables from No. 4 hatch. Five men are in the lower hold, two at the upper hatch and two loading hand trucks on the pier. The remainder of the gang trucks the perishables to the north wing of the pier. Nine 50-pound crates are put on one hand truck. A special conveyor is used for discharging bananas. Although cost figures are not available, one pier official stated that "one conveyor does the work of four to five men."

One gang was used to load general cargo from two lighters into No. 6 hatch.

A belt conveyor is used for loading general cargo into hatch No. 3.

Every Detail Planned

In observing the cargo handling operation of the MORRO CASTLE, one is impressed by the calmness which prevails on the pier. Every detail is planned before the ship arrives, thus avoiding confusion and lost time. By applying scientific principles and analysis, the one best method is used. The pier superintendent and the head stevedore—the company does its own stevedoring—secure the closest cooperation from the two assistant stevedores. Safety rules and regulations are strictly enforced and hazards are reduced to the minimum. Adequate lighting is provided for efficient night work.

Due to working on Sundays, labor costs are probably a little higher on the MORRO CASTLE. However, in this instance as in others, when a ship operates on a strict schedule, port time is more important than cargo handling costs. A ship that spends ten hours in port and in that time discharges and loads a combined total of 3700 tons of cargo by using scientific methods and principles, is performing the primary function of a ship earning a profit.

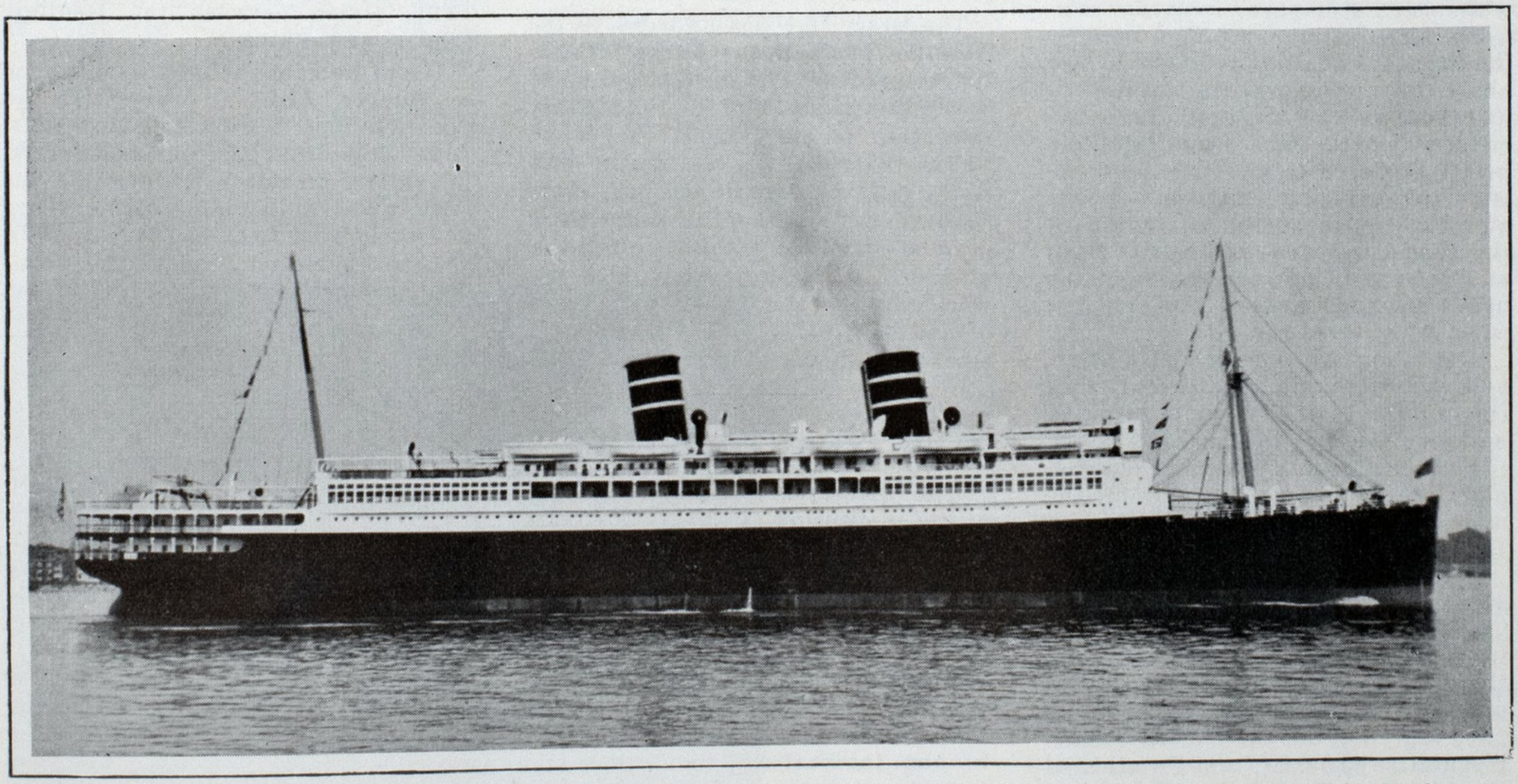
Buffalo Lighthouse Depot

Completion of the three-year project for the enlargement of the lighthouse depot at Buffalo, N. Y., was announced on Feb. 8 by Commissioner George R. Putnam, of the lighthouse service, department of commerce.

This work, which was commenced in the season of 1930, consisted of building bulkheads and filling in land to form a basin for the lighthouse tenders and other floating equipment, and additional shore space for storage purposes and for repair work.

Buffalo is the headquarters of the tenth lighthouse district, embracing the American waters of Lake Erie, Lake Ontario, and the St. Lawrence river. The depot is the base from which all lighthouses in the district are maintained. All supplies, and repair and maintenance work are handled from this point.

The new work, which has just been completed, consisted of constructing a concrete pile and timber bulkhead forming a retaining wall approximately 550 feet long. An old wall, approximately 470 feet long was also rebuilt. The area inside the retaining walls was filled in by a hydraulic dredge, this operation not only providing additional land for depot purposes, but deepening an extensive basin in which the lighthouse tenders will be berthed. To complete the basin, about 400 feet of wall was constructed, consisting of timber cribs filled and sunk in place, capped with pre-cast concrete blocks and mass concrete.



Morro Castle—Twin screw turbine electric. Entered service New York-Havana, Aug. 23, 1930—Speed 20 knots

Merchant Marine Sponsor, W. R. Humphrey Dies

William E. Humphrey, an able champion of the merchant marine for many years congressman from the state of Washington and until recently federal trade commissioner, died Feb. 14 at Washington, D. C., at the age of 71. He was appointed to the federal trade commission by President Coolidge in 1925, became chairman in 1927, and served for about two years in that capacity. At the end of his term as commissioner in 1931 he was reappointed by Presidnt Hoover.

In the summer of 1933 President Roosevelt requested his resignation, "without," as the President stated, "any reflection at all upon you personally or upon the service you have rendered in your present capacity." The President felt that the purposes of the new administration could be carried out more effectively with personnel of his own selection. Mr. Humphrey took the stand that his appointment had five years to run and declined to resign. On Oct 7 last year the President removed him from office.

It was while he was congressman from Washington beginning in 1903 and continuing for 14 years that Mr. Humphrey became nationally known as one of the most stalwart advocates of an American merchant marine. He had a profound knowledge of merchant marine affairs, and of the conditions which prevented the United States from taking its rightful position on the high seas. He favored a system of payment by the government for specific definite services rendered with the view of building up private operation on various ocean lines. A bill sponsoring merchant marine aid along these lines while Mr. Humphrey was in congress was unanimously approved by the senate, and was defeated in the house by a single vote. If this bill had become law at that time, the country would have been infinitely better prepared in meeting the problems of carrying American goods and passengers at the beginning of the World war and would have been at least partly prepared to meet the heavy demands made on our shipping when we entered the war.

His labors for a merchant marine, however, were not in vain, and, with the experience of the war in bringing out so clearly the urgent necessity of an adequate merchant marine, had their part in making possible the marine legislation of 1916, 1920 and 1928.

Mr. Humphrey was born in Indiana, March 31, 1862. In 1887 he graduated from Wabash college, and in the same year was admitted to the bar. He settled in Seattle and practiced law there from 1898 to 1902. In 1903 he was elected as representative at large from the state of Washington. He continued as congressman until 1917 when he resumed the practice of law in Seattle and in Washington. He was chairman of the speaker's bureau of the Republican national committee in 1922. He married Miss Helen Jackson of Seattle, Sept. 24. 1903.

Shawnee's Speed Record

The express liner SHAWNEE, of the Clyde Mallory lines, on her arrival at New York Feb. 16 from Jacksonville, Fla., had established a new speed record averaging 19.97 knots on the trip. The time for the run was 40 hours and 49 minutes as against the former record made a few years ago, also by the SHAWNEE, of 41 hours flat.

According to H. G. Wenzel, passenger traffic manager of the Clyde-Mallory lines, the SHAWNEE averaged 21 knots between St. John's bar off Jacksonville and the Diamond Shoals lightship.

Award Lock Contract

In the February MARINE REVIEW an item was published on the receipt of 14 bids Jan. 11, by the United States engineer office, Rock Island, Ill., for the construction of lock No. 11, Mississippi river in vicinty of Dubuque, Iowa.

On Feb. 16 word was receved from the United States Engineer office at Rock Island, Ill., that contract for the construction of this lock has been awarded to The Warner Construction Co., 173 West Madison street, Chicago. The Warner Construction Co. submitted a bid of $1,437,813.23, which was the lowest of the 14 bids received.

To Install Refrigeration

The Grace line has awarded to the Atlantic Basin Iron Works, Brooklyn, contract for the installation of refrigeration machinery and necessary insulation on its vesels, the S. S. SANTA BARBARA, SANTA MARIA and SANTA CLARA, for which bids were received on Jan. 23. The entire work is to be completed within two months, at a cost of approximately $200,000; work will be started on the SANTA MARIA on Feb. 21 and immediately thereafter on the other two vessels.

British Naval Architects

The seventy-fifth annual meeting of the Institution of Naval Architects will take place March 21 and the two following days in the Lecture hall of the Royal Society of Arts, John street, London. The annual dinner will be held on March 21.

A summer meeting of the Institution will be held in London next July. The feature of this meeting will be the International conference on experiment tank work.

Italian Line Inaugurates South Africa Service

A new service between Southern Europe and South Africa sponsored by the government of the South African Union and based on a trade agreement with Italy was inaugurated by the Italian line on Feb. 6 with the fast express liners DUILIO and GUILIO CESARE Both of these ships formerly served regularly between Italy and New York.

In addition to providing a new trade route between Europe and South Africa, several days faster than any established route, the new service, by connection with the speedy REX and CONTE DI SAVOIA cuts four or five days from the travel time between New York and South Africa.

Aroldo Palanca, general manager of the Italian line in America, on Feb. 10 announced the appointment of Capt. Giuseppe Cosulich as director of the Italian lines new South African service. He sailed Feb. 15 on the CONTE DI SAVOIA for Genoa for a conference with other directors of the Italian line before proceeding to his new offices in Capetown, South Africa.

Captain Cosulich comes from the famous shipping family of that name and is one of five brothers all of whom were educated for the sea and earned their captain's papers before going into the executive end of the shipping and shipbuilding business. He was born near Trieste in 1888, was educated in the public schools and graduated from the naval academy in Trieste in 1905. His education included two years on a German training ship, and after six years as a ship's officer he became captain of the S. S. LUCIA in 1911, plying between the Mediterranean and China.

When he came ashore he was sent to Buenos Aires to represent the Cosulich line, remaining there until 1914. Since that time he has served in variou official capacities for the Cosulich line including three years in China, from 1921 to 1923. In 1924 he was appointed head of the Cosulich line in New York, and, with the merger which formed the present Italian line in June, 1932, he became one of the three directors of the line in New York.

Captain Cosulich is well known in shipping circles in this country and has made many friends in New York during his ten years there. He is a member of the Whitehall, Larchmont Yacht, and Riverdale Tennis clubs, and of the Royal Italian Yacht club.

It is understood that the Peruvian Steamship Co., Lima, Peru, has invited bids for the construction of a 6000-ton floating drydock. The total cost is estimated at about $450,000.

Port Expansion Underway at Lake Charles, La.

By A. A. Nelson

IN THE short span of eight years the port of Lake Charles, La., has advanced from its birth to an important position in international commerce. The port was formally opened to ocean traffic in November 1926. In the intervening time steamship services have been established to Pacific and Atlantic ports, and to the principal ports of Europe, South America and the West Indies. In addition, infrequent sailings are made to all world ports.

Some idea of the shipping handled at Lake Charles can be gained from the fact that 264 ships docked at the port in 1932, an increase of 64 ships over 1931. The tonnage increase in 1932 was 10 per cent.

The port of Lake Charles is situated on the Calcasieu river, approximately 75 miles from Sabine bar. Entrance is made through Sabine pass, the Sabine river, Calcasieu ship channel and the Calcasieu river. Lake Charles is served by the Kansas City Southern, the Missouri Pacific and Southern Pacific railroads, and is on the Intercoastal canal.

Cotton Concentration at Port

Lake Charles is fast becoming a great cotton port. Cotton concentration is one of the leading features of the broad and consistent work of the progressive Lake Charles association of commerce which, in effect, is one with the dock board in pushing that institution.

The volume of cotton handled through the port during the season 1931-32 showed a tremendous increase over the preceding season, and for 1932-33 a very large increase over the previous year, the total receipts for the last season being 167,000 bales, with two months to go before reaching the end of the cotton year. It is anticipated that not less than 250,000 bales will be handled during the 1933-34 season.

Shippers and exporters have recognized the favorable rail rates from certain points in this section of the cotton belt, and the excellent highways leading from all directions for the trucking of cotton to the port for shipment to world markets. As a result, several large exporters have established headquarters at Lake Charles for the receiving and forwarding of cotton.

The increase in cotton tonnage has necessitated additional storage space and as a result, the Lake Charles Compress and Warehouse recently completed eight new cotton warehouses, classing room, office building, large receiving room, and high density compress at the docks. This in addition to the compress and warehouse facilities located on the Calcasieu river in the northern part of the city. With all these facilities, the compress company will have a season-capacity of 300,000 bales.

There are hundreds of trucks employed in the handling of cotton from all sections of the state of Louisiana, and southern Arkansas and eastern Texas, to the port of Lake Charles. Cotton is also arriving by rail, due to the rail lines readjusting their rates to meet truck and barge competition.

Rice constituted the principal commodity handled at the outset of the port's activities. Subsequently, a general cargo business has been developed, covering a wide range of commodities such as cotton, lumber, wrapping paper, nitrates, fertilizer materials and considerable general cargo. It is worthy of note that more rice clears through the port of Lake Charles than through any other port in the United States, more than 2,000,000 pockets of 100 pounds each being handled annually.

In addition to the cargoes mentioned, there is brick, flour, building tile, packing house products, live stock, salt, kraft paper, mineral water, naval stores, furniture and lubricating oils, the last five or six items of which are moved coastwise.

A bond issue amounting to $700,000 was authorized and was issued and sold in May, 1931. Contract was awarded for construction of additional docks, and the new docks are now under construction.

The new layout consists of a wharf 1600 feet in length by 200 feet in width, of concrete, metal and steel construction, with double marginal tracks, making it possible to handle commodities direct from cars to ship. This dock will have two transit sheds, each measuring 700 x 160 feet. One of these sheds is now complete and in service, and the balance will be completed about the first of October this year.

Additional Facilities Under Way

With the completion of the new wharf, the port will have 3200 feet of berthing space, accommodating eight to ten ships at one time, and approximately 440,000 square feet of covered area, with considerable open space. The facilities are modern in every respect. A complete sprinkler system will be installed throughout the wharf and sheds, affording minimum insurance rating. The total investment in marine terminals is $1,800,000.

The port of Lake Charles is municipally owned and controlled. The board of commissioners are: W. P. Weber, president; Guy Beatty, vice president; E. R. Kaufman, secretary; R. Krause, treasurer, and Frank Roberts. A. A. Nelson is director of the port; C. D. Arnold is traffic manager, and O. G. Richard is assistant traffic manager. Oliver E. Weed, with headquarters in Chicago, is general agent; Charles W. Cocke is traffic agent, and R. H. Pratt is insurance engineer.

The author, A. A. Nelson, is director of the port at Lake Charles, La.

Lake Charles, La.—One of the transit sheds on the new wharf of concrete and steel construction. The modern terminal facilities when completed will represent a total outlay of $1,800,000

The United States engineer office, St. Louis, Mo., on Feb. 20 opened bids for the lease and operation of two cutterhead hydraulic pipe line dredges in the Mississippi river between the mouth of the Ohio river and Clarksville, Mo., and in the Missouri river from Herman, Mo., to the mouth.

Wage Incentive Plan Will Increase Efficiency

IT HAS been well established that employes, left to their own incentive, do not in general produce anywhere near their capacity of work. Also, it has been well established that the best results can be obtained only with the aid of a well designed wage incentive plan.

To the average employe the question of wages is of first importance in his relationship with his employer. Good working conditions, fair hours of work, steadiness of employment and the quality of leadership on the part of the bosses, are all important, but they are not complete in themselves. If the wages are not "right," the working force will be discontented and a high rate of labor turnover is bound to result. "Right" wages give a man proper compensation, for every dollar's worth of work he performs, attract the right kind of men and aid in maintaining a loyal and efficient working force. All wages should be set with the objective of fair results for both employe and employer; the employe to receive a fair rate of return commensurate with his efforts, the employer to secure high production at low cost.

Cannot Expect Ideal Results

It is important not to expect ideal results from any plan. Considerations of its limitation is as importans as consideration of its advantages.

Low wages are often a false economy resulting in lower output, poor workmanship, strikes and labor troubles in general.

Modern management understands the common sense of paying high wages and then providing equipment, methods and supervision that obtain adequate results for the money expended.

Wages should not be figured as dollars and cents paid for a man's time, but as dollars and cents paid for service or production accomplished.

The solution of the wage problem for a particular pier lies in a careful study of all systems in their suitability to meet local conditions, and not in an arbitrary selection and adoption of one particular wage plan which has worked to advantage in another situation.

A wage system that is elaborate and costly to maintain defeats its own purpose. Similarly, if the wage system cannot be easily understood by the rank and file worker, it is doomed to failure. Workers object to any system by which they cannot readily compute their wages.

There is no logical argument against the wage incentive plan. Objections are not sound because they are based upon lack of understanding of such plans and the results which they have accomplished under a wide variety of conditions.

On Co-ordinating Marine, Rail Transportation

Coordination of marine and rail transportation can be effected with profit to both shipping and railroad companies, if the difficulties with respect to organization friction can be overcome. That is, from the physical point of view, the methods and equipments with which this coordination can be effected are available.

For example, it is physically practical on some railroad owned marine terminals to unload cargo from railroad cars direct to pallets, carrying the pallets to the terminal with fork trucks and keep the cargo on pallets until the ship is ready to load. When floor space is scarce, the loaded pallets may be piled two and three high. When the ship is ready to load, the loaded pallets can be picked up by fork trucks and carried to shipside where, with bridle slings, the loaded pallets can be hoisted into the ship. When conditions in the ship permit, it is possible to use fork trucks for carrying the loaded pallet close to the point of stowage.

Some practical men are giving serious consideration to the stowage of cargo on pallets in the ship, so that handling of cargo will be still further reduced.

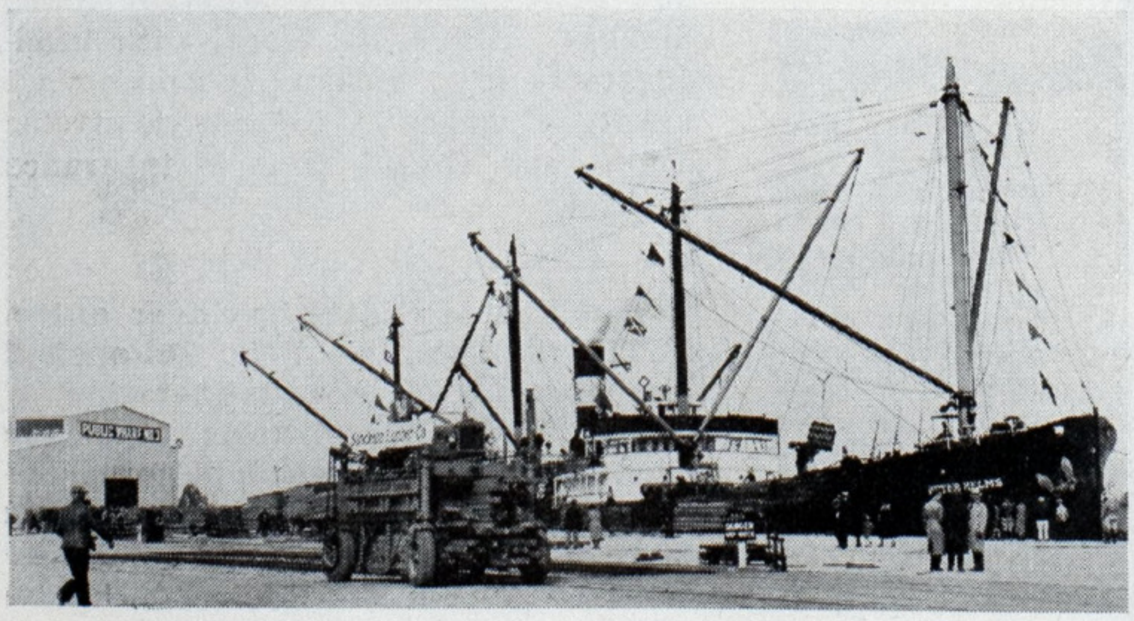
At some ports, coordination of marine and rail transportation is possible by stowing trailers in lighters, instead of unloading from the trailer to the deck of the barge and loading on trailers at the point of delivery for hauling into the sideport of a ship. If it is necessary at any time to load cargo overall, it is possible to handle trailers in the ship in the same manner as is done by the Canadian Pacific at Montreal. There, the trailers are landed on 10 feet length of "track" placed on cargo and then wheeled to place of stowage. However, the actual coordination of marine and rail transportation at the ports referred to above, depends either upon enlightened executives getting together and putting these plans into effect, or the action of a higher authority, which will force the elimination of organization friction which prevents both railroad and shipping companies from saving large sums of money.

Washington Auxiliaries

Among marine engineering achievements in 1933 the Westinghouse Electric & Mfg. Co. refers to the auxiliary machinery on the S. S. WASHINGTON of the United States lines which entered service in May of that year. On this vessel, and her sistership, the MANHATTAN, the largest merchant ships built in American shipyards, the electrical load is nearly 4000 horsepower. There are more than 8000 lights. The 93 electrically driven fans and blowers have a combined capacity of some half million cubic feet per minute. They run at low speed and are specially mounted to reduce noise to a minimum.

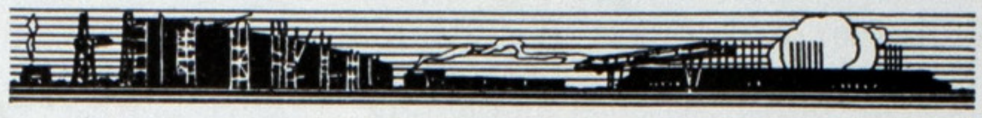
Cargo is handled by 20 motor-driven winches. Eighteen smaller motors are used for hoisting lifeboats. Two motors of 90 horsepower each are used to operate the anchor windlass and a 75-horsepower motor operates each of the warping capstans.

The generating plant consists of four turbine driven, 500-kilowatt direct current generators. Unusual provisions are made to insure a continuous and reliable source of power, but in an emergency at 75-kilowatt generator driven by a diesel engine supplies power to operate the emergency bilge pump, the watertight doors, the radio, and other essential functions.



Coastwise steamer Peter Helms of the McCormick Steamship Co. alongside pier at port of Stockton, Calif. Note length and arrangement of booms

Useful Hints on Cargo Handling



GOOD management necessitates distinguishing between administrative ability and technical knowledge and ability. Business and government are replete with examples of men who managed well without any technical knowledge of the work or processes involved. The chief executive of a large ice company became top executive of an elevator company and has managed it successfully for years; A lawyer managed an insurance organization successfully and other men have managed successfuly without technical knowledge of business.

Administrative ability is the ability to direct men, to organize and to utilize the technical knowledge and ability of others. Frequently, technical men are selected for administrative positions and the result is not satisfactory and sometimes it is disastrous because these men are not qualified to organize and direct the activities of others.

For this reason, in selecting a man for the position of operating manager of a large shipping company, technical ability and experience should be subordinated to administrative ability and experience. If a man can be obtained who is a good administrator and also a good technical man, so much the better. The point is to place the emphasis where it belongs—on administrative experience and ability.

Time Operations Properly

CO-ORDINATION of the work in the hold of the ship, with the work on the terminal is important to obtain the best results. Recently, the author saw an operation which was poorly co-ordinated in that sling-loads were accumulating in the ship, because the trucks on the terminal were not being operated properly. The trucks were routed in such a manner that they got in each other's way, causing delays and the equipment was not properly used for the particular cargo handling operation being performed.

The haul was long, and the proper equipment for the operation was a combination of fork trucks, pallets and tractors and trailers. The fork trucks could be used to load and unload the trailers and pile the loaded pallets two and three high, as dock space requirements might make advisable. The tractors and trailers are most effective for long haul work and should be used invariably for such work, but their effectiveness is decreased when the costly work of loading and unloading trailers is performed by hand; this is properly the work of fork trucks working with pallets.

THIS page is being devoted to short items on all matters having to do with the more efficient turn-around of ships. These items are intended to be of a helpful nature.

We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.

Productive Overhead

THE problem is, not only in keeping overhead down, but in making necessary overhead productive. This resolves itself into a problem of spending a dollar in such a way that you at least get back the dollar. The determination of whether the dollar spent in overhead is returned with or without a profit is more difficult than if the dollar is spent on fuel, for example.

However, the result or lack of result should be determined and with the aid of the methods developed by scientific management, the accuracy of measurement is high. Scientific management is the term covering the application of the scientific method to management.

Formerly, at a coastwise terminal, cargo was unloaded from motor trucks to the floor and piled. At the opposite end of the pile, at the same time the truck was being unloaded, the longshoremen were picking up the packages and loading them on trucks for hauling to shipside. With a new management, the trucks are unloaded on trailers and hauled direct to the ship, saving in expense, delay and reducing pier congestion.

Dispatch of the ship may be expedited in case of shipping board lake type ships, by hauling cargo from one forward hatch to the other, and from one after hatch to another. For example, if the No. 2 hatch has a larger number of bales of cotton than No. 1, when the No. 1 gang finishes with the cotton stowed in the No. 1 hold, cotton may be dragged from No. 2 hold and hoisted to the dock through No. 1 hatch.

Kegs of beer should be stowed with the bungs (top and side) down, so that they are covered with beer. When this cannot be done top of keg should be covered with fresh water when stored.

Paint and Temperature

IT IS not entirely for the purpose of adding to its appearance that the Canadian National Steamships has painted the PRINCE DAVID which runs between Miami, Fla. and Nassau, a shimmering white.

Experiments have shown that the painting of the exterior white reduces the interior temperature of the ship by 15 degrees. Because of this, all ships of the Canadian National in service in southern waters have exterior coats of white.

Mistakes on stowage plans should be avoided because of the confusion and loss of time which they cause. Making up a stowage plan is a comparatively simple matter, requiring chiefly close attention to the work.

Lot number tags should be placed upon bales of cotton to facilitate checking. Frequently, the mark on the bale is obliterated or torn away, in which case the lot number tag assists greatly in checking and delivering the lot.

Use Electric Elevator

A portable electric elevator is used at the state pier, New Bedford, Mass., for lifting bales of cotton to make a second tier of bales on motor trucks. The elevator is placed at the tailboard of the truck. A bale is elevated to a little higher than the bales on the floor of the truck and then it is rolled into position.

The Holmes wharf at New Bedford, Mass., formerly used by the Colonial line is 100 years old. It was an important place in the whaling ship days of the port.

Up and Down the Great Lakes

Ore on Hand—Ocean, Lakes Service—January Lake Levels—Draft Markings Required—Barge Canal Service

DURING the season of 1933 Lake Erie ports received a total of 16,323,150 tons of ore. The balance of ore remaining on docks of Lake Erie ports Feb. 1 totaled 5,246,278 tons as compared with 5,131,577 tons on Feb. 1, 1933. The total lake shipment of ore to Lake Erie ports in the season of 1932 was only 2,707,548 tons. This indicates that nearly four times as much ore was shipped to destination from Lake Erie ports in 1933 as in 1932.

Lakes—Atlantic Trade

The Nicholson Universal Steamship Co. recently announced that it had chartered the three vessels SANTA VERONICA, SANTA ISABEL, and SANTA EULALIA of the Atlantic and Great Lakes Steamship Co. which had been in operation between Boston and Chicago during the past season.

It is understood that these steamers are to be operated between Detroit and other lake ports and North Atlantic ports including Boston, via the St. Lawrence river and canals. The vessels will be engaged in carrying automobiles and general cargo.

Direct Service from Lakes

Donald L. Phelps of the Great Lakes Transatlantic Agency, Chicago, representing the Newfoundland-Canada Steamships Ltd., has announced that seven modern steamers have been chartered for the service between the lakes and Europe for the coming season.

None of these vessels is more than four years old and one of them is now nearing completion.

Three sailings a month are to be provided from Chicago and other lake ports to various European ports.

Henry G. Elfborg, 63, president and treasurer of H. Channon Co., Chicago, ship chandlers for the last 15 years, died Jan. 30 at his home in that city. Mr. Elfborg was born in Sweden and came to this country in 1890. He became a civil engineer and was the inventor of several devices used in railroad constructtion.

In the report for the year ending Dec. 31, 1933 the Detroit & Cleveland Navigation Co. shows a net loss of $446,109 after depreciation, taxes, etc., compared with a net loss of $748,562 in the year 1932.

Current assets as of Dec. 31, 1933 were $2,057,206 which included $1,883,316 in cash and securities. The current liabilities were $117,153. This compares with cash and securities of $2,312,692 and total assets of $2,517,349, and current liabilities of $98,913, on Dec. 31, 1932.

At the annual meeting of the Great Lakes Dredge & Dock Co., William P. Feeley was elected a director filling the vacancy caused by the death of H. J. Niederman. All other directors were re-elected.

The Delta line, owned and operated by Mississippi Shipping Co. Inc., has opened an office at 625 Marquette building, Chicago, under the management of W. L. Blackman.

January Lake Levels

The United States Lake survey reports the following monthly mean stages of the Great Lakes for the month of January, 1934, determined from daily readings of staff gages.

Lakes	Feet above mean sea level
Superior	602.35
Michigan-Huron	577.46
St. Clair	572.08
Erie	569.97
Ontario	243.59

Lake Superior was 0.13-foot lower than in December, and is was 0.28-foot above the January stage of a year ago.

Lakes Michigan-Huron were 0.11-foot lower than in December, and they were 0.16-foot below the January stage of a year ago.

Lake Erie was 0.15-foot lower than in December, and it was 0.70-foot below the January stage of a year ago.

Lake Ontario was 0.22-foot higher than in December, and it was 0.74-foot below the January stage of a year ago, 1.48-foot below the average stage of January of the last ten years.

The Federal Motorship Corp. operating the three motor vessels BADGER STATE, EMPIRE STATE and BUCKEYE STATE via the New York State Barge canal, it is reported is planning sailings every nine days, starting early in April, between New York and Philadelphia and Chicago and Milwaukee. The vessels are fitted for carrying refrigerated and general cargo. It is said that the run between New York and Chicago is to be made in sixteen days.

Joseph Folkman Dies

In the death of Joseph Folkman, president of the Akers-Folkman Co. Cleveland loses one of its most prominent and picturesque steamship travel agents. He died on board the Holland-America liner, STATENDAM, on Friday, Feb. 9, when the vessel was one day out from New York bound on a Mediterraneau cruise. Mr. Folkman was accompanied by his wife and he was conducting a party of Clevelanders on the cruise. His widow will return with the body sailing on the REX from Gibraltar Feb. 22 arriving in New York Feb. 28. Funeral services are to be held in Cleveland on March 2. Death was due to heart failure.

Mr. Folkman had been connected with the steamship agency business for over fifty years, beginning as an office boy in Cleveland, shortly after he arrived in this country from Hungary where he was born. He is survived by his widow, a son and daughter.

Capt. James Hilbert, 67, day dispatcher and assistant manager of the local office at Cleveland of the Great Lakes Towing Co., died at his home on Feb. 15, after a long illness.

He had been associated with the Great Lakes Towing Co. for 17 years. Prior to his connection with this company he had sailed on the lakes, his career going back to the days when sailing ships were not uncommon. He is survived by his widow, a daughter and a son.

John E. Barclay, for 38 years a member of the ore shipping department of Pickands, Mather & Co., Cleveland, died at St. Luke's hospital, Monday, Feb. 12, of heart disease. He had been ill for less than a week.

Mr. Barclay joined the company in 1896 as an office boy, having been hired by the late Harry Coulby. His entire business life was spent with the company.

He is survived by one daughter,

Baltimore Traffic Increases, Conditions Favorable

Results at the port of Baltimore for the year 1933 were approximately equal to 1932, with this significant difference, the last six months showed material increases in all departments of trade and shipping. Port activity had reached a low point in the first half of last year, with recovery factors becoming apparent in June. Substantial monthly increases were noted from this time to the end of the year. Business is much more promising for 1934.

Export and import trade at Baltimore in the last six months of 1933 was 63.5 per cent better than the first half of the year and 47.3 per cent ahead of the comparable period in 1932. The year's total foreign trade was valued at $72,466,035, with December nearly three times better than the low point of April. Exports for 1933 were $26,005,091 and imports $46,460,944. Total 1933 foreign trade increased by $1,237,472 over 1932. This was represented by an increase in exports of $917,444 and an increase in imports of $320,028. December exports were 117 per cent better than December, 1932, while December imports were 75 per cent better than in December of the previous year.

Traffic Gains at Newark

A marked general increase in the traffic at the port of Newark, N. J., for the year 1933 is reported in a statement issued by Mayor Meyer Ellenstein in an analysis of the annual report of James W. Costello, chief engineer of the city.

In 1933, over a hundred more vessels than in the previous year used the port of Newark docks. The total number of vessels was 450 and general cargo of more than 475,000 tons was handled. Cargo outbound increased by 137 per cent and cargo inbound by 49 per cent. This increase was mainly in intercoastal tonnage. Lumber received by water increased 24 per cent and totalled 142,203,355 board feet. There was a substantial increase also in the employment of railroad cars, trucks and lighters.

Arnold A. Schantz Dies

Arnold A. Schantz, well known Great Lakes shipping man, retired president of the Detroit & Cleveland Navigation Co., died at Miami Beach, on Jan. 28. He had been gravely ill since last December.

In addition to his long career as head of the Detroit & Cleveland Navigation Co., he was one of the best known yachtsmen on the lakes, and was for a number of years commodore of the Interlake Yachting association and he was also commodore of the Detroit Yacht club for three terms.

Mr. Schantz was born in Galion, Crawford county, Ohio, April 10, 1861. His father was a Bavarian immigrant who became one of the leading citizens of Mansfield, O. His mother was a member of an old and distinguished Ohio family. At the age of 14 he became the Mansfield agent for Cincinnati newspapers, and two years later became general delivery clerk in the postoffice. During this period he continued his studies evenings.

His first connection with the transportation business came about when he was 17 in arranging for an excursion to Dayton. Shortly after this he was appointed agent at Mansfield for the Detroit & Cleveland Navigation

Co. He soon became traveling agent for this company and was extraordinarily successful in securing business. His rise with the company was by gradual steps. In 1884 he was made general western passenger agent and general passenger agent eight years later. He became general superintendent of passenger traffic and a member of the board of directors in 1902. In 1907 he was appointed general manager and in 1913 vice president. He was elected president of the company in 1919.

In addition to his connection with the Detroit & Cleveland Navigation Co. he was interested in numerous business and civic activities. He was very widely known and exceptionally popular and well liked socially, in business and in sports. He belonged to numerous clubs and associations.

It was under his presidency that the GREATER DETROIT and GREATER BUFFALO, among the very largest and finest passenger vessels on the inland waters of the world, were built and placed in service.

Draft Marks Required on Barge Canal Boats

R. D. Hayes, commissioner of canals and waterways for the state of New York, on January 29 issued a statement to barge canal owners and operators emphasizing the importance of the canal regulation with reference to draft markings on boats.

The regulation with reference to draft markings on boats is as follows: "All boats of every nature operating on the canal normally drawing over 6 feet shall be plainly marked both fore and aft on each side showing the actual draft of the boat at all times. The markings shall be of such color paint as to be visible at all times 100 feet away. The figures shall not be less than 4 inches in height and the draft markings shall be at the bottom of each such figure. All draft markings shall show feet and half feet of draft."

The commissioner points out that this regulation must be complied with because of the increasing depth of loading on the barge canal and the decreasing water stages of the Great Lakes which control the depth available in Oswego harbor and that part of the Erie canal lying between Tonawanda and Lockport.

Strict observance of the regulation and the accuracy of the markings are of importance not only to the department but also to all owners and operators in safeguarding their vessels and cargo. It is of particular interest to insurance companies.

The commissioner suggests that inconvenience and delay incident to placing draft markings on vessels using the canal during the season of navigation be avoided by attending to this matter while the boats are laid up and in light condition before operation begins.

Made Superintendent

Charles C. Brush of Philadelphia, formerly assistant engineer in the marine engineering division of the lighthouse service in Washington, D. C., was recently appointed superintendent of the first lighthouse district, embracing the waters of Maine and New Hampshire. His offices are located at Portland, Me.

He will be in charge of all work in maintaining navigational aids, such as lighthouses, lightships, buoys and other minor aids, from Maine-New Brunswick border to the southern limits of the New Hampshire coast line. This district includes the important port of Portland, Me., the shipbuilding city of Bath, Me., and the United States navy yard at Portsmouth, N. H.

The United States engineer office at Chicago will receive bids on March 1 for the construction of two steel hull work boats.

Reviews of Late Books

Ships and South Africa, by Marischal Murray; 360 pages; 10 x 7½ inches; with 332 illustrations; published by Oxford University Press, New York and London; supplied by MARINE REVIEW for $14 plus 15 cents postage and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

Steam navigation to South Africa goes back to 1825 and this book gives a complete survey of subsequent developments on the Cape route down to the present day. Not only does the author describe the establishment of the steamship lines and early rivalries for mail and passenger traffic, but he also deals with notable events of the passage during times of peace and war. Shipwrecks and disasters are included and a short "life history" is given of every important liner which has been engaged in the trade.

In a foreword the noted South African soldier statesman J. C. Smuts calls attention to the fact that the history of South Africa would be incomplete without a record of maritime enterprise from the days of sail down the present age of steamer and motor liner and that this record had so far been confined almost exclusively to the sea travel of sailing ship days. The present book now gives the first detailed history of the steamships and shipping companies that have played so great a part in the development of the dominion.

Mr. Murray's book is a monumental and absorbing record of the development of steam navigation in the South African trade. The first vessel fitted with steam power reached Table Bay in 1825. Twenty-five years elapsed before a regular line of steamers was running between England and the Cape. And it was not until two decades later that the steamer came into her own. This coincided with the discovery of diamonds in South Africa. It was this significant combination of circumstances, the author points out, that chiefly helped to revolutionize the overseas communications of the country. This revolution was complete after the opening of the gold fields not many years later.

Mail and passenger traffic in South African shipping today is a calm, well ordered, almost dull business compared with the intense rivalries that prevailed during the last twenty years of the ninteenth century. Fierce opponents then, have now joined forces and competition is no longer particularly exciting. In appearance and design the vessels of today do not have the variety and originality of the older days. As the author says, "Ship designers and ship owners at present seem to have no feeling on the matter, for the fashionable cruises of today, the luxury motor liners are too often grotesque in their appearance, with funnels unsymmetrically placed, ungainly cruiser sterns and clumsy looking upperworks."

The story of the South African steamship begins with the combined passenger cargo vessel and it is with these ships of the mail and passenger lines that the book is mainly concerned. Included are also ships that go via Cape to destinations beyond, because Capetown has long been the halfway house and these vessels are as well known in Table Bay as are the African liners.

This book is a splendid piece of work and will appeal to everybody interested in the great developments that have taken place in steam navigation in the past 100 years. Not only will the reader be rewarded by much information both by word and picture concerning the fine vessels past and present on this great sea route, but he will also get an interesting insight into many events of historical and political significance.

A Hundred Years of Towage. A History of William Watkins Ltd., 1833-1933 by Frank C. Bowen; 215 pages 8 x 5¼ inches; privately published by William Watkins Ltd., London.

The towing company, William Watkins Ltd., founded in 1833, was within a few months of being the pioneer in the towing business on the Thames in England, and it has lasted with increasing vigor and prosperity long after every one of its old time rivals on the London river has gone and been forgotten.

This book gives an interesting account of the early methods and equipment used in towing with illustrations of some of the earliest vessels in the business. The present tug of today is also illustrated and described so that this book may be said, though dealing with the career of one company, to give an excellent account of the development of towing craft.

Along with the change in equipment much information is also given on the change in the service and requirements of the towing business, as exemplified in this record of one of the leading and most successful companies.

The Great Lakes-St. Lawrence Deep Waterway to the Sea, by Tom Ireland, LL. B., A.B.; 220 pages; and illustrated; published by G. P. Putnam's Sons, New York; supplied by MARINE REVIEW for $2, plus 15 cents postage and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

At the present time in the midst of a lively discussion for and against ratification by the United States senate of the treaty negotiated with Canada by President Hoover for the joint development of the St. Lawrence river into a seaway, this book, which favors the project, will be read with unusual interest, whichever side one may take.

The author points out that for practical purposes the Great Lakes-St. Lawrence waterway to the sea, of even greater importance than Panama, and with the new Welland canal already detouring Niagara Falls, is to take the Atlantic ocean, from the straits of Belle Isle at the mouth of the river St. Lawrence, and to place it at the waterfront of Duluth, Minn., 2340 miles into the heart of the continent, granting to the ports on this new seacoast the full benefit of low ocean rates to the markets of the world. In comparing the cost of transportation over long distances by ship and rail, he refers to a ratio of ten miles by ship to one by rail.

Over the seaway's 27-foot channel steamers will glide past the reloading stations that now consume profits by expense and delay and four out of every five vessels now plying the seven seas need be loaded just once for direct transit abroad.

Importance of Section Served

It is emphasized that the Great Lakes tributary area to be particularly benefited in the United States is a region of factories and a farms, of mines and of forests, where 45,000,000 people get their livelihood, providing half of the agricultural wealth of the nation, half of its manufactures, and half of its foreign trade.

Plans for the St. Lawrence seaway are not confined to navigation alone, but include the development, incidental to the construction of the necessary navigation works, of 5,000,000 installed horsepower of hydroelectric energy, to 1,100,000 of which United States will be entitled.

There are fifteen chapters in this book. The first chapter discusses the necessity for cheap and easy ocean transportation for the midwest. Consideration is given in chapter 2 to the savings possible by eliminating reloading at transfer points, storage and insurance charges. In chapter 3 the author takes up the regions and industries to be benefited by lower shipping rates and outlines the commodities to be carried.

In subsequent chapters various features of the waterway are described, such as the kind of ships that will use the seaway and the types that will not; sectional objections in the United States and Canada with some reference to an alternative all American route, and a comparison of the bene-

(*Continued on Page* 40)

Personal Sketches of Marine Men

R. J. Baker, President, American Steamship Owners' Association

By Ben K. Price

HIS election as president of America's leading shipping organization followed eight years of service as its secretary and treasurer.

HE IS convinced that an efficient American merchant marine must be established for the safety and prosperity of the nation.

CONFIDENCE in his fairness and judgment is based on his personal qualifications and his grasp of the problems confronting the industry.

Photo by Keystone View Co.

FROM a small inland town in Pennsylvania, in the slate regions, where the Appalachians veer slightly westward in their majestic sweep to the south, comes a new leader of American steamship owners. Pleasant spoken, mild mannered, studious, and, in physique, of medium height and build, he is far from the heavy fisted, huge framed, rollicking type of shipping man which fiction would decree as mandatory for such a job. Yet he is a man, whose experience and ability have, by actual test, well qualified him for the responsibilities of his task, a man with keen understanding of shipping problems and with a special gift as a coordinator and harmonizer.

As president of the American Steamship Owner's association, R. J. Baker brings to his new position eight years of executive experience with the organization and more than 15 years affiliation with foreign trade and marine shipping. For more than a year and a half, or since the death of H. B. Walker, who died in June, 1932, and whom he now succeeds as president, he had, in fact, been called to carry the duties of his present position, duties which fell in one of the most crucial periods in the history of American shipping. That he did the job well is attested by his recent election, an election, incidentally, unique in the records of the association in that it was the first time the membership had drawn upon a man for president who in no way was directly affiliated with a ship operating company.

Apart from his actual experience, he has had an academic training of special value in his present work. With a Ph. B. degree received at Muhlenburg in 1918, he took a special course in shipping and foreign trade at the University of Maryland and post graduate work at John Hopkins university, and followed this up with law at New York university, from which he was graduated with a J. D. degree in 1926. All of this he worked in while regularly engaged in shipping activities.

His father was identified with the slate industry at Bangor, Pa., but Mr. Baker's earlier forebears were shipping men for generations without break—Cornishmen from that rugged promontory at the southwest tip of England, where martime tradition flows as freely as the tide of the English channel itself, which washes its southern shores. Hence, it is not surprising that Mr. Baker, an inlander by birth, should early have become interested in shipping and in all of its related subjects.

His first affiliation with shipping came in 1919 upon his return from overseas, as a member of the well-known A. E. F. He became manager of foreign trade for the Export and Import Board of Trade, Baltimore, which later became merged with the Chamber of Commerce of that city. In the several years to follow he made personal visits to every important port in the United States and Canada, and with the first-hand information thus obtained, was in no small measure instrumental, through his organization, in obtaining the necessary legislative action for the $53,000,000 improvement program undertaken at the port of Baltimore.

Since his first affiliation with the American Steamship Owner's association in 1926, as secretary and treasurer, he has lead more than one successful fight in the advancement of American shipping. His testimony before the Shannon committee of the house of representatives, submitted in Chicago, had strong bearing on the committee's final recommendations relative to competitive shipping, and in President Roosevelt's recent declaration for direct subsidy is seen the embodiment of certain of the association's aims, which he and the shipping committee had strenuously advocated for more than a year.

For some time past Mr. Baker has been active in the formulation of the shipowners code, and perhaps his talent for coordinating effort and setting up an atmosphere of harmony has never shown to better advantage than in his alignment of the seven or eight groups, or branches, that comprise his organization.

Mr. Baker and his family reside in Pelham, N. Y. His principle diversion are music and literature.

Electric Welding

(*Continued from Page* 17)

were then carefully faired and welding was proceeded with as follows:

The forward transverse bulkhead was drawn hard up to fore end of center line bulkhead by temporary lugs and bolts tack-welded on. Then two welders started simultaneously at the top corner, one welder being at each side of the center line bulkhead, and put in one run of fillet connecting weld from top to bottom forming the connection of transverse bulkhead to center line bulkhead. This fillet was then cleaned and inspected, and a second run was deposited starting from the top as previously. The connection of the after transverse bulkhead to the center line bulkhead was then welded similarly. The bottom connection of the center line bulkhead to the keel plate was then welded by two welders working one on each side starting from the after transverse bulkhead and laying down continuous single runs to the forward bulkhead as they did in the case of the vertical corner joints.

Transverse web frames, center line bulkhead panels and transverse bulkheads of the next compartment were then erected and, after fairing, the joint of longitudinal bulkhead was welded to the transverse bulkhead which had already been welded in the ship. When this connection was completed the longitudinal bulkhead joints to forward and after transverse bulkheads were made, and after that the connection of the longitudinal bulkhead was made to the keel plate. In every case the welders worked away from the fixed structure, so that contraction was as free to take place as possible and tied welds were avoidl ed. The remaining compartments of the ship were dealt with in a similar manner.

Center Strake Deck Plating

The next part of the structure to erect was the center strake of deck plating. This was stopped each side of hatches and so was not a continuous strake; after fairing it was welded to the longitudinal bulkheals, the welding in this case being overhead, The amidship panels of deck plating and shell plating were then put in place and faired. The welding procedure here was to weld the midship transverse butts of deck first, and then the longitudinal seam to center strake. The vertical midship butt of the shell was also welded first; the next butt forward and aft was then welded, and so on. No other connections were welded till the transverse vertical butts were first welded. Thus longitudinal strains due to contraction were so far as possible eliminated.

When all these butts were completed the connections of the longitudinals to the transverse bulkhead were made, the pads at the ends of these longitudinals being driven in a tight fit on one side before any welding was done. Then the transverse bulkhead boundaries to deck and shell, and the connections of transverse web frames to deck and shell, were welded, the procedure being similar to that already mentioned, namely, by two welders working on opposite sides. Where transverse web frames crossed seams of plating the welding connection was stopped about 1 inch each side of the seam.

The longitudinal framing clear of straight sides, that is, from No. 3 tank aft and from No. 2 tank forward, after the chain locker had been built, was erected as is usual building practice, and the shell plating was put on plate by plate. No holes were punched in any plate for erection, and for this purpose bolts were tack-welded on where required. In this case the welding procedure was to weld all vertical butts first, always working away from the fixed part of the structure to avoid locked-up strains. The fore and aft end deck plating panels were then put on and the transverse butts welded aftter fairing and before any other connections were made.

Testing Under Pressure

The oil tanks and other compartments of the ship were filled with water and tested under pressure head of 4 feet above deck to British Corporation requirements, no serious leaks being found. In fact, it was a case of filling and passing the tank immediately thereafter. In about half a dozen places where slight dampness showed through the welding this was cut out and rewelded after the tank was emptied.

Careful deflection tests were carried out on the longitudinal bulkhead in No. 2 tank, and on shell sides, bottom, and transverse bulkheads; it was found that the maximum deflection under pressure was 3/16-inch, which on the pressure being released completely disappeared, leaving no permanent set. This maximum amount was in the center line bulkhead about one-third of the height from bottom and midway between the web frames.

Launch of the Vessel

Sights were erected on deck to note the breakage during launching, but no breakage occurred, and after launching no signs of straining or fracture were found in any part of the structure. That there was no permanent set shown by the deflection tests. also that there was no breakage during or after launch, points to the absence of slip in the joints of the structure. In a riveted structure it is usual to find some amount of permanent set after deflection due, no doubt, to slight slip in the riveted joints, which in a welded structure is absent. In this case the small deflection appeared to be due to the elasticity of the material which, of course, was not stressed up to its limit, and returned to its original form on the pressure being released.

Saving in Weight

The weight in this ship was 19.5 per cent less than a riveted ship of the same dimensions; but a riveted ship to carry the same amount of cargo would have been of larger dimensions, and the saving in this latter case works out to 20.6 per cent.

Voyage Across Atlantic

For crossing the Atlantic it was considered advisable to ballast the ship to about half her maximum draft. Accordingly, the cargo tanks were filled with water on alternate sides of the center line bulkhead.

During the voyage extremely bad weather was experienced which at one time drove the ship and tug about 150 miles north of her course. Heavy seas lifted the lifeboat out of its chocks and severely damaged it. The connecting link between the rudder quadrants on deck was bent slightly, but with these exceptions no other damage was done to the ship. On arrival at Montreal the ballast water was pumped out, she loaded up a cargo of petrol and started her first voyage without any delay.

Good Record in Service

Since going into service the ship has proved to be very efficient and given satisfaction to her owners, as is shown by an extract from a letter received from them which reads as follows:

> "We are up to the present writing more than satisfied with the performance of the PETER G. CAMPBELL. The barge is an excellent carrier.
>
> "The welded construction for such a type of craft will be more advantageous than rivet construction, in the operation of craft, in so far as running repairs for canal damages are concerned.
>
> "This is proven by collision with float at Greeces Point. Had the vessel been riveted, and struck on the same part of the ship, there is little doubt that rivets on the angle bar of bow fender would have been sheared with consequent leakage in the fore peak. In this case, there being no angle bar, and no rivets, the shell plate was set in and the fender bar followed the plate, without being loosened. When repairs are done, it will be simply a process of jacking the whole structure back, without loosening the plates."

I would like here to mark my appreciation of the efforts of all who co-operated so well in the building of this ship: Superintendents, de-

(*Continued on Page* 40)

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April Distinctive Ship Issue

Marine Review

Featuring American Shipbuilding Progress

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Make sure your advertisement appears in the April Distinctive Ship issue of MARINE REVIEW, where it will be seen by marine men responsible for ship design, shipbuilding, and ship operation.

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Ship owners, operators, shipbuilders, naval architects and marine engineers find the Distinctive Ship Number of Marine Review of greatest usefulness, because it gives them in one place, under one cover, the most definite and accurate information on every type of ship recently completed. The following quotations from letters received demonstrate the practical value of this issue.

Shipyard executive:

"The April issue certainly embodies useful and valuable information on various vessels, the accuracy of which is of prime importance."

Prominent steamship manager:

"Your Distinctive Ship issue showing various types of vessels with concise descriptions we consider particularly useful as a reference volume."

New York marine engineer:

"We use the section devoted to Distinctive Ships as it is of special interest and valuably informative."

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This important and exclusive presentation of up-to-date American shipbuilding data is of unusual interest to every responsible person connected with the marine trade.

All the Distinctive Ships and shipbuilding information is grouped in a special section. The attention value of your advertisement appearing in this section is apparent. Many concerns each year take advantage of this outstanding opportunity to tell about their products and service in an effective way. Only full pages appear in this section. Early reservation of space is suggested, copy to reach us on or before March 15. The Distinctive Ship Number is out on April 1.

Marine Review

220 Broadway
New York City

Penton Building
Cleveland, Ohio

135-M

Book Reviews

(*Continued from Page* 36)

fits of the seaway to Canada and United States.

Other subjects in connection with the proposed seaway covered are hydroelectric water power; what has already been done and what remains to be done to complete the seaway. The Chicago diversion is considered. Details of the cost in building the seaway are given. Relations of the seaway and the railroads are considered and facts are given to show that it would not divert appreciable traffic from the railroads.

In chapters 14 and 15 consideration is given to the influence of the seaway on Great Lake ports and the cooperation between these ports and the seaway for maximum benefits. The suggestion is made that the seaway is primarily desired in the United States and that we should cooperate with Canada in her present willingness to carry out this project.

The Last Survivors in Sail, by John Anderson; 54 pages; 7¼ x 4¾ inches; with drawings and photographs; published by Percival Marshall & Co. Ltd., London; supplied by MARINE REVIEW and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

The Last Survivors in Sail is a factual record of square rigged sailing ships still at sea and of those lost since the Great war. It is intended to serve as a convenient segregated summary of these present day representatives of a glorious age on the seas, now all but over.

The name and history of each vessel is briefly summarized with particulars on dimensions and whether of steel, iron or wood construction. In practically all instances the place and date of building are given. The career of each ship and present owner are also summarized. Many illustrations are given from photographs and about an equal number from drawings by J. C. Burnie. The cover design, from a drawing by R. H. Penton, shows a tall square rigged ship with all sails set.

This book deals only with cargo carrying square rigged sailing ships; cadet ships which do not carry cargo and auxiliary vessels are not included. Mention has also been made of the number of sailing ships now rusting away at anchor on the American Pacific coast as they will probably never put to sea again, according to the author.

English Warships in the Days of Sail, a brief historical guide for model making, by A. Guy Vercoe; 72 pages; 8¾ x 6 inches; numerous illustrations; published by Percival Marshall & Co. Ltd., London; supplied by MARINE REVIEW and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

Though this book is intended principally as an aid to accuracy in ship modeling there are many interesting sidelights on British naval supremacy in the building and subsequent careers of many of the famous ships of the line in the early days and down to the middle of the nineteenth century.

In this very attractive book the author has paid more attention to the outward and visible features of the ships than to their inner arrangement. The author himself considers this book as an introduction of beginners to the art of model making.

The chapter headings are: beginnings of the Navy; Henry VIII's Navy; Ships that Fought the Armada; Ships of the Stuarts; The Eighteenth Century (1690-1760); Ships of the French Wars (1760-1816); Last Fifty Years of Sail; and finally Anachronisms and Pitfalls. The coloring of warships and a table of ordnance are given in two appendices.

There is much in this book besides the undoubtedly valuable information on model making. There is a historical summary well told of the beginnings of the British navy and some of its exploits, all of which will be interesting to anyone who has a leaning towards the sea and ships.

Performance and Test Standards, for self priming centrifugal pumps, a handbook, published by the LaBour Co. Inc., Elkhart, Ind; 30 pages; 8 x 5 inches, with diagrams, and tables; distributed free on request by the publishers.

This handbook has been published with the view of supplying a set of standards upon which self priming centrifugal pumps may be specified. The standards have been selected so that all pumps of the centrifugal self-priming type may be honestly and accurately rated, compared and measured in common terms.

An attempt has been made to establish some definite standard on which the practical and commercial performance of pumps of this type may be accurately judged. In self priming centrifugal pumps, in addition to capacity and head, two additional factors, air capacity and vacuum capacity, must be considered. The standards presented in this handbook are intended to clarify these factors and to establish arbitrary but necessary points upon which to erect a system of classification and measurement.

(*Continued from Page* 38)

signers, and workmen. The order was received about the middle of January (1933), the first keel plate was laid on Feb. 1 and welding started on Feb. 9. Water testing of compartments was completed on April 12, the ship was launched at 4:30 p. m. on that day, and was complete ready for starting her voyage in tow on April 15, a total time, including design, of, approximately, three months.

I also wish to record my thanks to Messrs. Swan, Hunter & Wigham Richardson, Ltd., for so kindly granting me facilities to read this paper, and to my colleagues on the staff of that firm for their wholehearted cooperation and assistance. Also to the Quasi-Arc Co. Ltd., whose electrodes were used throughout, and who gave me most valuable assistance with the supervision of the welding work. And especially do I wish to mention The British Corporation Register of Shipping & Aircraft, who not only gave most valuable assistance with the design, but also with the supervision of the construction.

(*Continued from Page* 26)

enough so that "outage" from failure of the tube material itself does not warrant replacement.

Special tools have been designed for use in installing rapidly by either of the two above methods. To prevent electrolytic action, parts should be of the same materials as the tubes. The manufacturer is prepared to furnish parts in the copper and copper-nickel alloys.

These methods are offered by the manufacturer with entire confidence that they are superior to any other method of tube fastening which has ever been brought forward.

Oil Tanker Ordered

It is understood that the Standard Shipping Co., New York, for account of its Argentine subsidiary, has placed an order through Sir Joseph Isherwood, with the Furness Shipbuilding Co. Ltd., England, for an oil tanker. The new vessel will be 350 feet in length between perpendiculars, 60 feet in breadth molded, and 17 feet, 6 inches depth molded. She is to be propelled by triple expansion reciprocating steam engines built by the North-Eastern Marine Engineering Co. Ltd., Wallsend-on-Tyne. Cylinder diameters are to be 16 x 26 x 42 inches and the stroke is to be 27 inches.

Elected Vice President

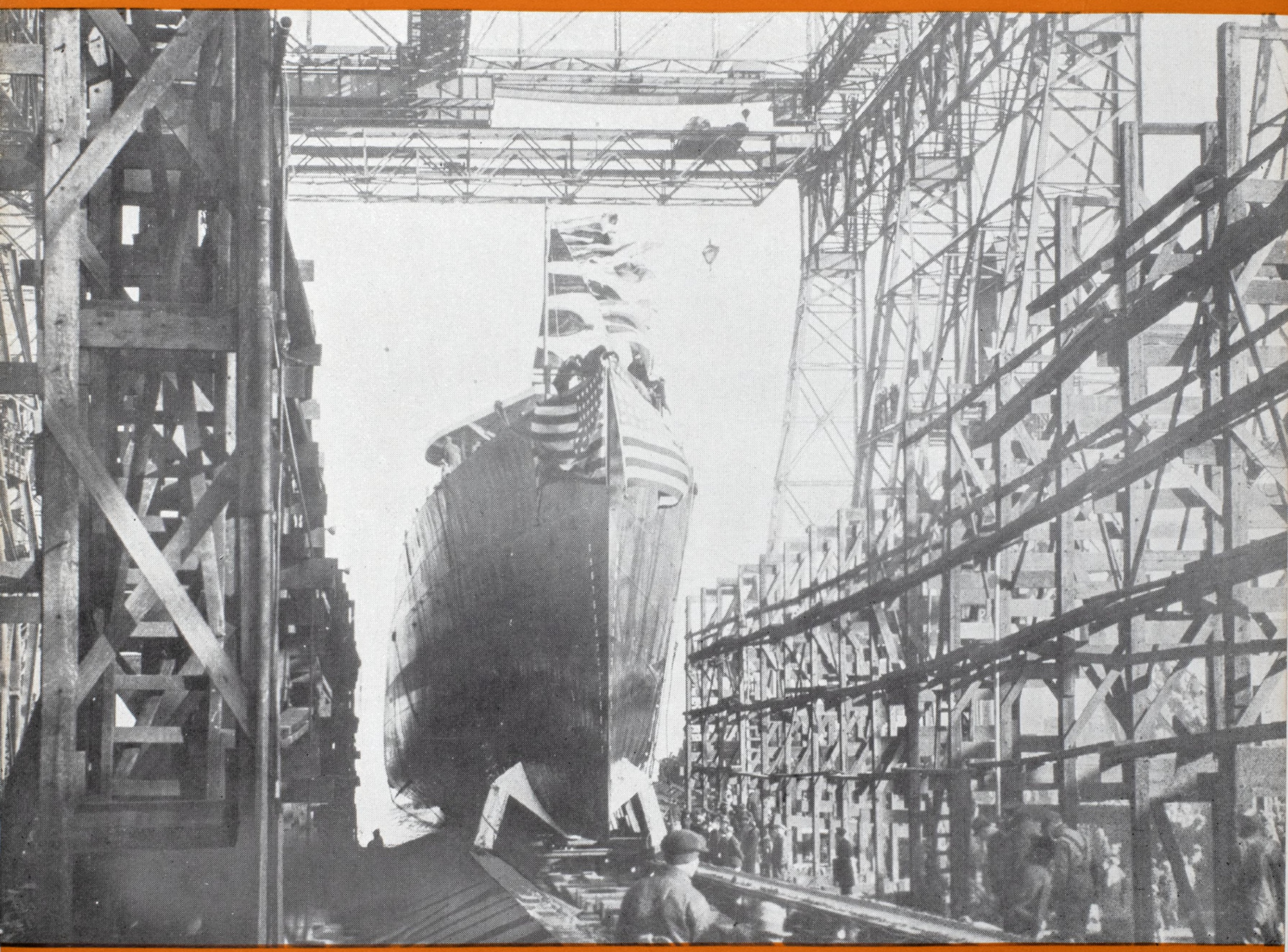
Following a recent meeting of the board of directors of the Westinghouse Electric & Mfg. Co. in New York, A. W. Robertson announced the election of A. E. Allen as vice president. Mr. Allen will have charge of the merchandising division which is now established as a separate operation distinct from other divisions of the company. He will have charge of all sales, manufacturing and engineering activities of this new division.

Mr. Allen has been with the Westinghouse company since 1902. Until 1925, when he was made general manager of the Lamp company—later becoming vice president—his services had been in the Electric company.

Marine Review

Reg. U.S. Pat. Off.

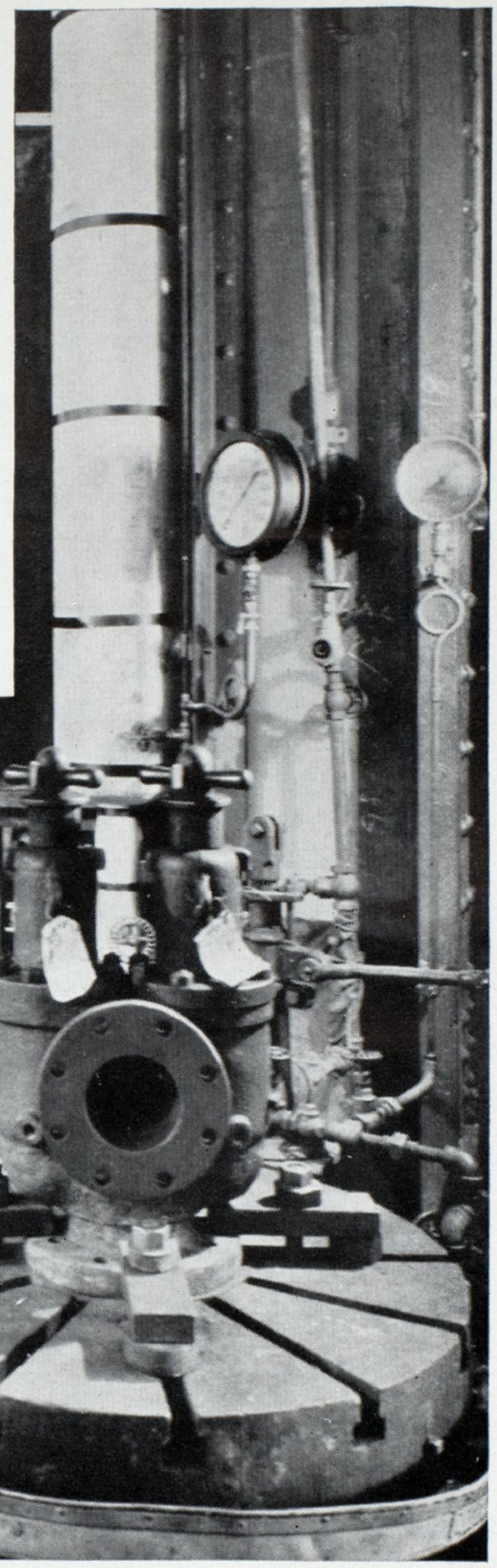
The National Publication Covering the Business of Transportation by Water



Launching of U. S. S. Hull

March, 1934

SAFETY VALVES ADJUSTED AT *your* STEAM PRESSURE . . . with this new American Ship equipment



NOW we can offer positive assurance that safety valves adjusted by American Ship will come to you adjusted at your own working steam pressure. For with the new equipment pictured here we test valves at the *steam* pressure you actually use. And, so far as we know, we are the only concern on the Great Lakes having this equipment and offering this service.

Every valve that comes to us for repairs is inspected by trained and experienced workmen, who carefully grind in snug-fitting new seats and supply any necessary new parts; then the valve is adjusted to operate on *your* working steam pressure. New American Ship valves, in the same way, are assured proper adjustment for your needs.

When a valve, adjusted by hydraulic test, fails under working steam pressure, it costs you time and money. Avoid such losses by having American Ship repair your valves and check them at *your* operating steam pressure.

THIS new steam testing compressor provides steam for "popping off" safety valves at any pressure—up to 500 pounds—with but two or three pounds drop in pressure. It enables us to test stop valves, check valves, throttle valves and many other steam specialties under operating steam pressure conditions. It helps us service not only marine engines and boilers but also similar industrial equipment, especially for power and light plants.

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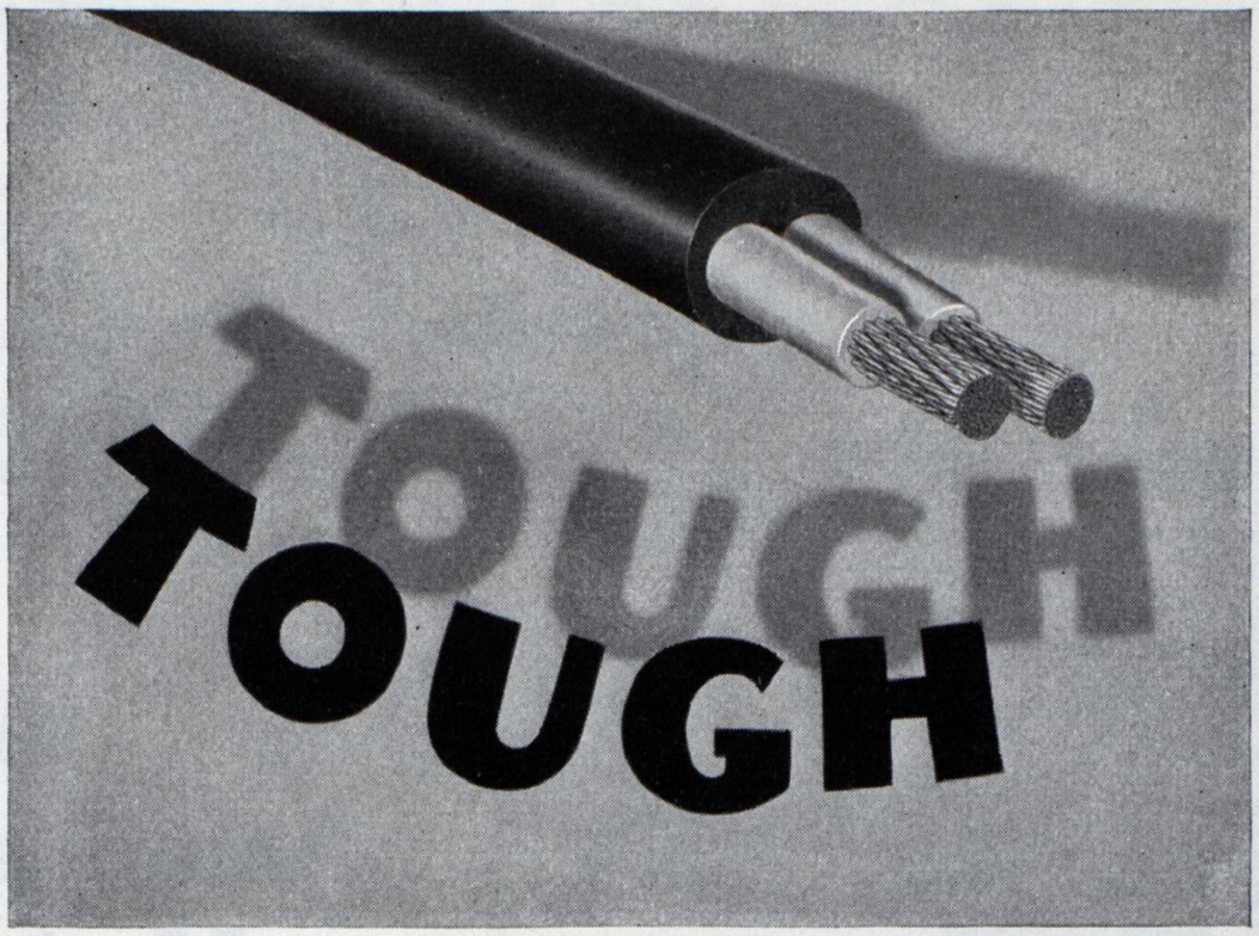
Vol. 64, No. 3, March, 1934, issue of MARINE REVIEW, published monthly at Cleveland, O. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. Subscription price $3 a year in U. S.; Canada, $4; Great Britain and other foreign countries, £1. Single copies, 35c

Portable Cable for Shipyards



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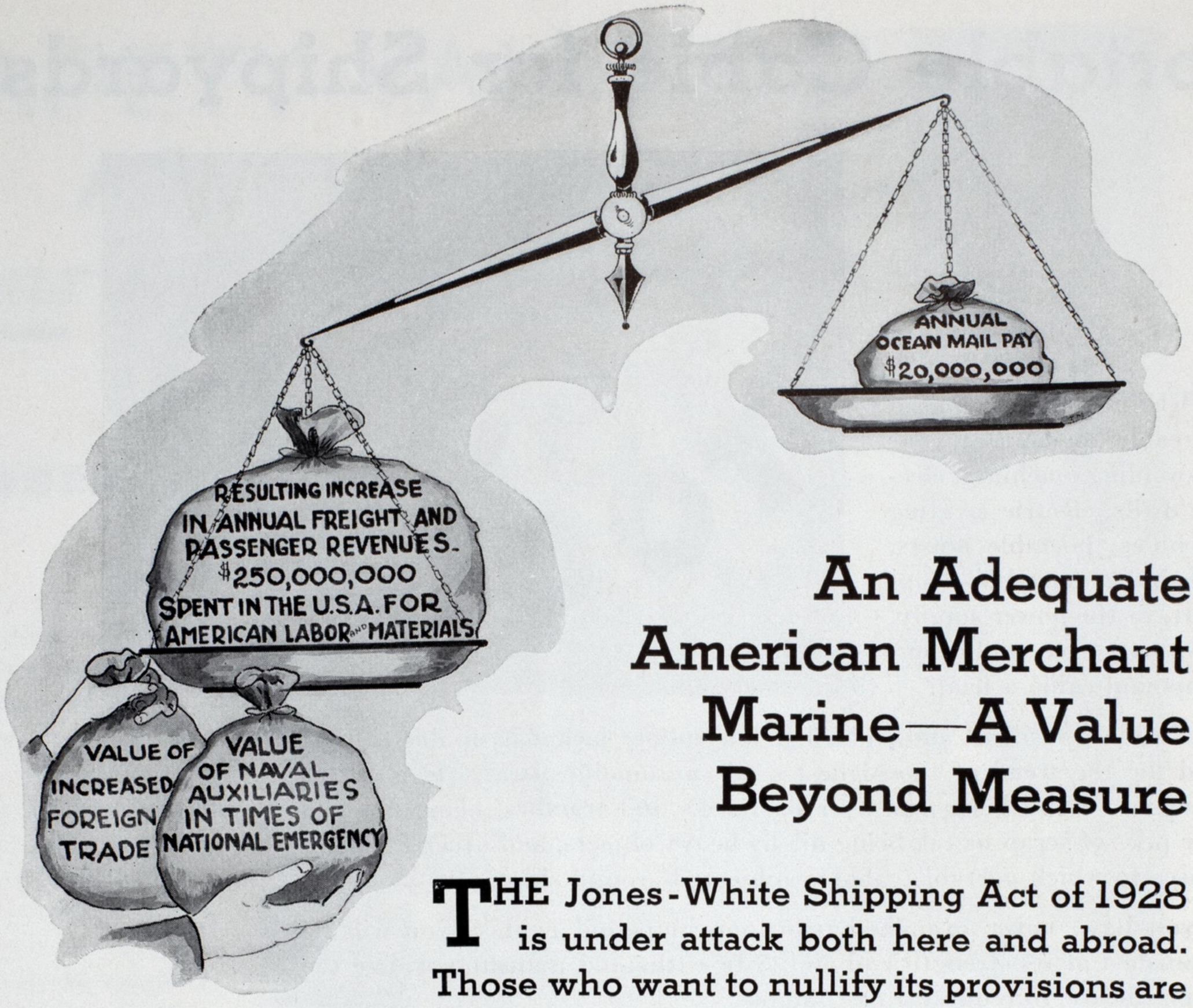

An Adequate American Merchant Marine—A Value Beyond Measure

THE Jones-White Shipping Act of 1928 is under attack both here and abroad. Those who want to nullify its provisions are working to scuttle the American Merchant Marine. In this country an attempt has been made to justify these attacks on the ground of economy. It is claimed by some individuals that the United States could save $20,000,000 a year by abolishing our ocean mail contracts. But in urging this claim critics disregard the other side of the ledger.

Examine the record for yourself. You will find that Government aid for American ships is repaid to American industry and labor many times over. You will discover that an adequate American Merchant Marine is indispensible to the development of our foreign commerce. You will understand that in times of national emergency a modern merchant fleet is necessary for our well being and security.

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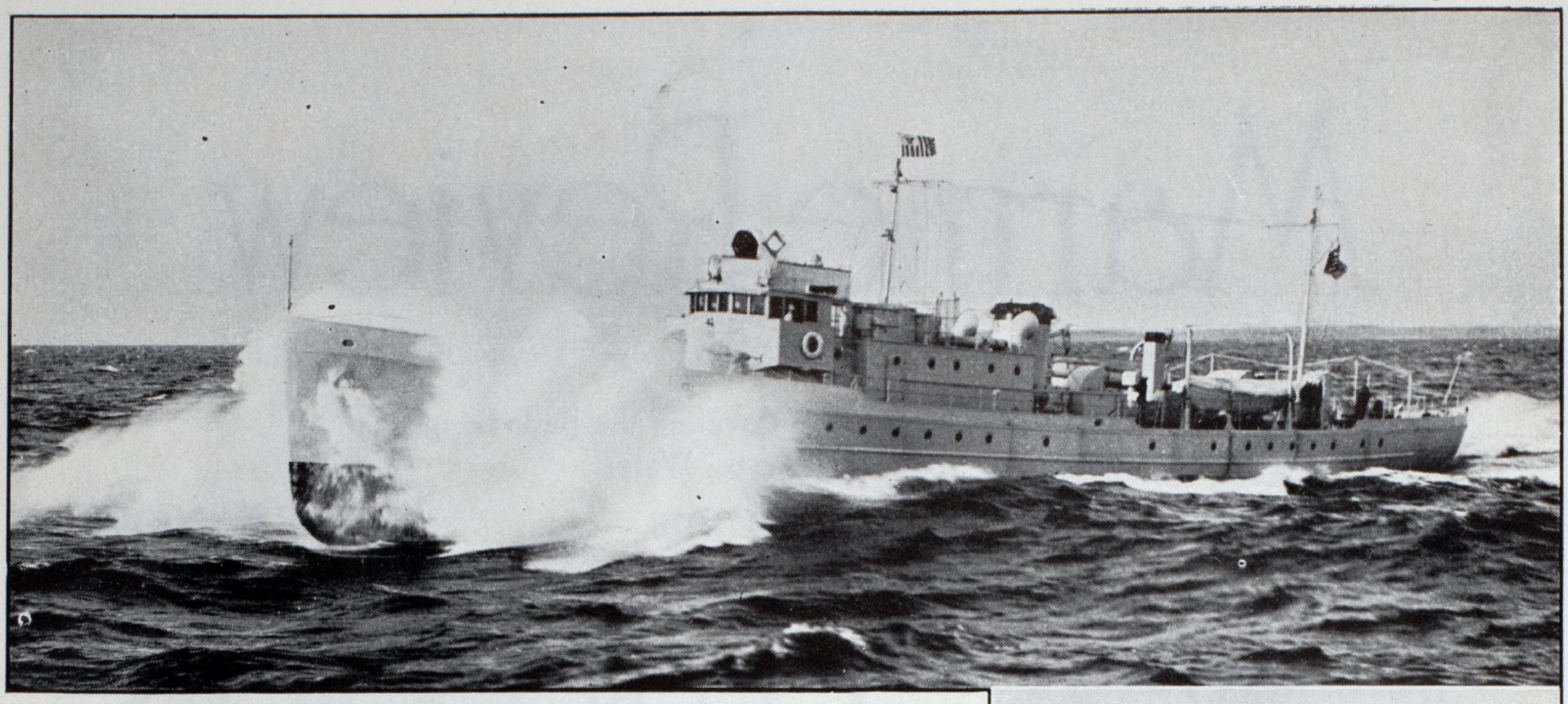
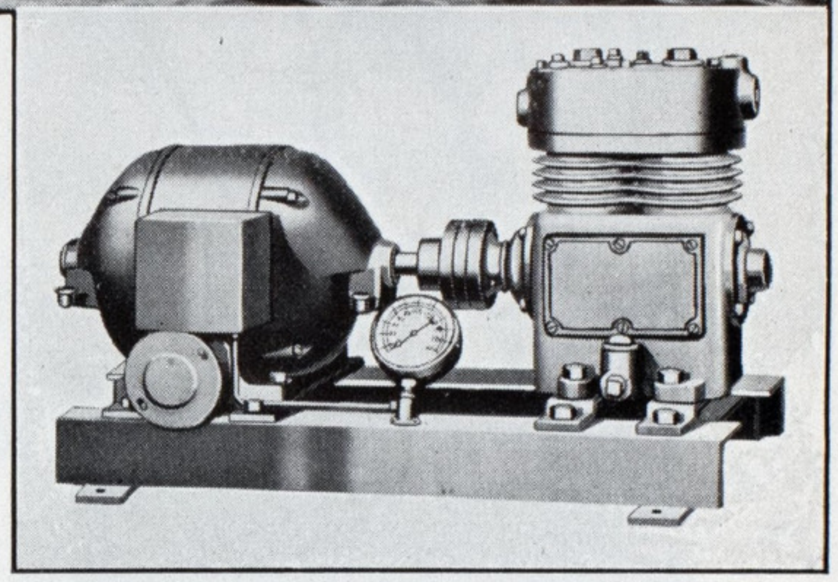


Air Compressors for Any Type of Craft



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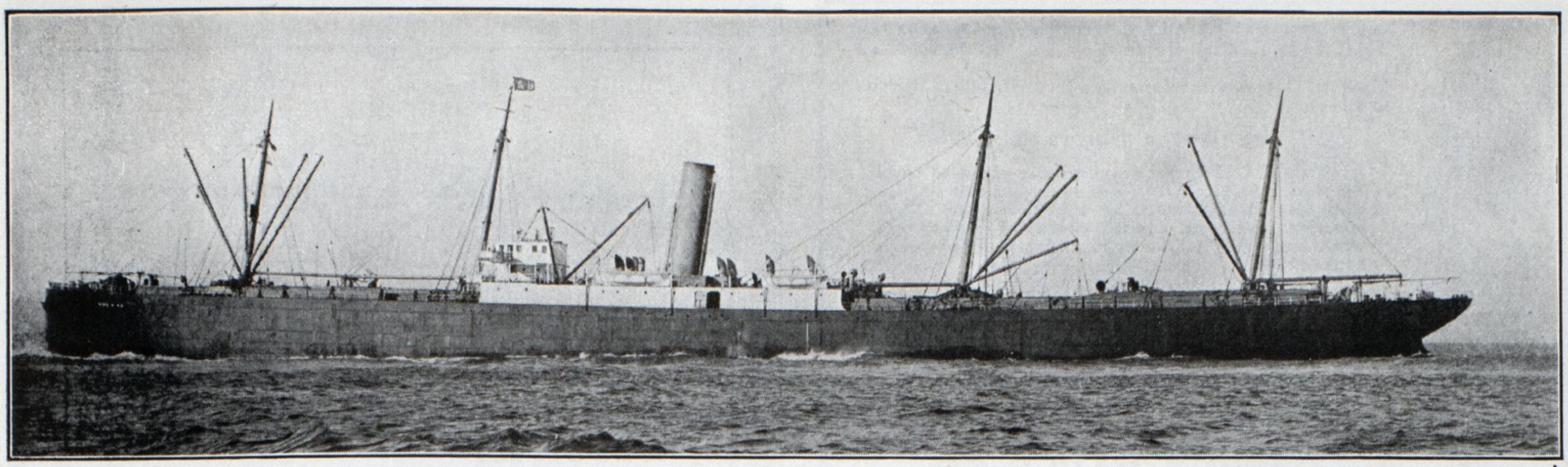

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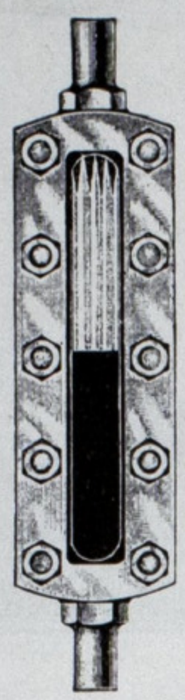

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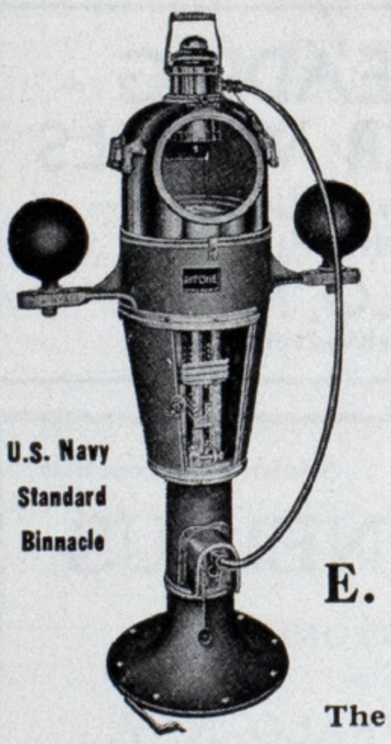

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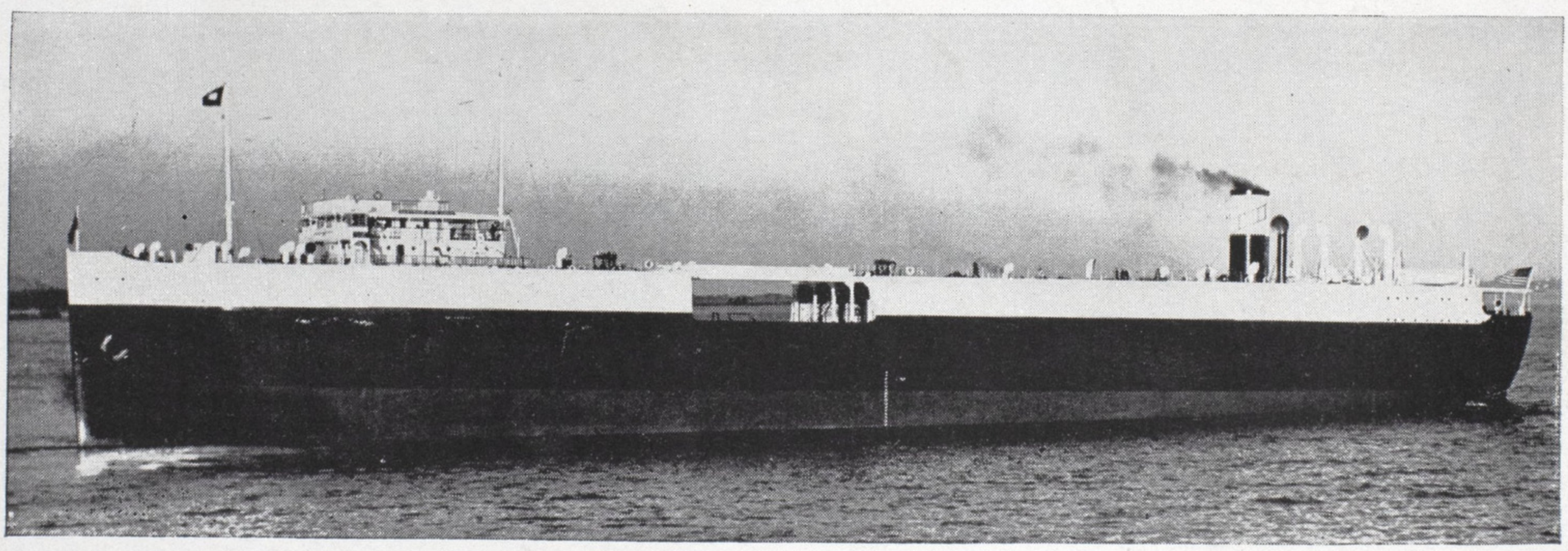

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